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TESTS FOR ENGLISH 2

(TELECOM.-INDUSTRIALS)

SECCIÓ D'ANGLÈS. 1996
Carmen Rueda
Clàudia Barahona.

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Note: In every test there are differents texts corresponding to Telecommunications and to Industrial Engineering.

TEST 1

I. Choose the correct answer. Only one is correct.

1.- A long-playing record recorded at 33 1/2 rpm __________ be played at 33 1/2 rpm.
a) might b) should ~~to~~ [✓ c) must] d) ought + to

2.- An insulator is a material__________________________.
a) through whom electricity cannot flow
[✓ b) through which electricity cannot flow]
c) that electricity cannot flow through
d) which electricity cannot flow by

3.- This is the overhead projector__________________________.
a) who professor H. works with
b) with whom professor H. works
c) with that professor H. works
[✓ d) which professor H. works with]

4.- The article__________________ is very good.
[✓ a) he wrote] c) who wrote
b) who he wrote d) whom he wrote

5.- The computer system is divided__________ different parts.
a) as b) of [✓ c) into] d) up

6.- The idea of keeping instructions for the computer inside the computer memory______________ significant changes in computer technology.
a) was given rise to c) resulted of
[✓ b) brought about] d) produced by

7.- The company had to close down_____________ the oil prices went up.
a) on account of b) due to c) because of [✓ d) as]

8.- The motor overheated_____________ dirt in the air gap.
[✓ a) because of] b) because c) as d) since

9.- If you join these two sentences "*Heat causes expansion in substances. Heat makes the atoms and molecules move more quickly*", the result is:
a) Heat causes atoms and molecules FOR moving more quickly
[✓ b) Heat causes atoms and molecules to move more quickly]
c) Heat causes ~~that~~ atoms and molec. move more quickly
d) Heat causes atoms and molec. ~~from~~ FOR moving more quickly

NOUN/PRONOUN DESCRIBED + THAT + SUBJ + VERB + COMPLEMENT

II. Read the text carefully and choose the right option.

THE ANTENNA.

Radio transmission channels use radio wave propagation between transmitter and receiver antennas. Both types of antenna can be directional and non-directional. A non-directional transmitting antenna radiates energy uniformly in all directions. It might be used with a public broadcast transmitter which is centrally located in the region it serves. A non-directional receiving antenna is equally sensitive to radiation from all directions and might be used with a general purpose radio receiver ***[10]***____________ make available a wide range of programmes transmitted from many different locations. INF.

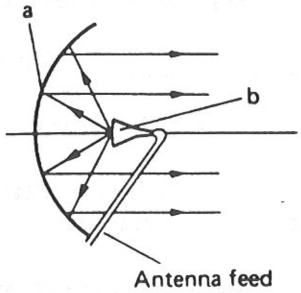
A directional-transmitting antenna radiates more energy in some directions than in others and might be used for point-to-point communications. It would then be aimed towards the receiver ***[11] in order to give off*** a maximum amount of energy. ***[12]***

Directional-receiving antennas are more sensitive in some directions than in others. They are used, for instance, with television receivers which operate on a set of frequencies allocated to transmitters ***[13]***__WHOSE__ antennas share a common location. Directional-receiving antennas have directions of minimum as well as maximum sensitivity, and it is sometimes more effective to point an antenna in such a way that it is less sensitive to an interfering signal, than it is to point it so that it is more sensitive to the wanted signal. For instance, television reception may be affected by "ghosts" ***[14]***__________ waves reflected from tall buildings or hill. These waves take longer to reach the antenna than the main signal and can produce a troblesome second picture displaced from the main one. If you rotate the antenna, you ***[15]***________________ this ghost picture because it becomes less sensitive to the reflections ***[16] causing*** the trouble.

The rhombic antenna consists ***[17]***_____ a pair of horizontal wires mounted on poles. The wires form a radiating transmission line ***[18]***________ is terminated at one end by a matching resistor. The Yagi array contains a dipole antenna ***[19] made up of*** two stright co-linear conductors, a set of director rods in front of the dipole, which is in the direction of maximum sensitivity, and a reflector rod behind it. A dish antenna comprises a parabolic reflector with a feed, which can be a dipole or a horn.

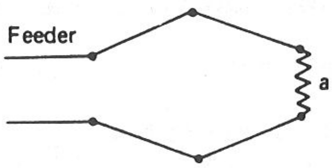
[20]

1.



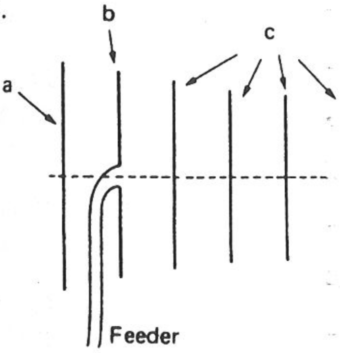
________________?

2.



________________?

3.



________________?

THE FUNCTIO OF ... IS TO ~

10) a) for + ING [✓ c) so as to]
b) it~~s~~ function is to d) in order ~~for~~ TO

11) One of the following COULD NOT BE SUBSTITUTED BY ***"in order to give off"***. Which one?
a) so as to give off c) for giving off
b) to give off [✓ d) for ~~to~~ give off]

12) According to the first two paragrahs only **ONE** of these statements is ***TRUE***. Which one?
[✓ a) A non-directional receiving antenna has all-round sensitivity.]
b) A directional-transmitting antenna transmits equally in all directions.
c) A non-directional antenna is used for point-to-point communication.
d) All antennas can be aimed.

13) a) which CUAL [✓ b) whose WHO] c) that QUE d) whom A QUIEN

14) a) since b) as [✓ c) due to + NOUN] d) the reason FOR why

15) [✓ a) will avoid having] c) would avoid having
b) avoid to have d) prevent to have

16) ***"causing"*** means the same as:
a) who are causing c) that are caused
b) that causes [✓ d) which cause]

17) a) in [✓ b) of] c) into d) up

18) a) who QUIEN b) whom A QUIEN [✓ c) that QUE] d) by which

19) ***"made up of"*** could be substituted by:
a) for~~med~~ FORMS c) wh~~i~~ch constitutes
b) divided INTO [✓ d) composed of]

20) According to the description given in the last paragraph, choose the right name for each type of antenna:

a) *1. Rhombic antenna* *2. Yagi array* *3. Dish antenna*
[✓ b) *1. Dish antenna* *2. Rhombic antenna* *3. Yagi array*]
c) *1. Yagi array* *2. Rhombic antenna* *3. Dish antenna*
d) *1. Dish antenna* *2. Yagi array* *3. Rhombic antenna*

21) According to the last two paragraphs. Only **ONE** of these statements is ***FALSE***. Which one?

[✓ a) Directional receiving antennas are equally sensitive in all directions.]
b) TV reception can be affected by high ground or buildings.
c) A second TV picture can be caused by reflected signals.
d) Directional antennas can improve reception.

III. After reading the text, answer the questions below.

[22] The first satellites were seen as a way of communicating with people who lived in isolated areas of the world. ***[23]***______________, earth stations began to appear in the most remote parts of the globe. ***[24]*** The cost of satellite communication began to fall steadily. ***[25] Consequently***, satellites have to compete with submarine cables as a way of linking continents cheaply. However, with the arrival of undersea cables made of optical fibre, a more balanced division of intercontinental circuits ***[26] between the two*** is likely. ***[27]*** Satellites were soon used to broadcast TV programmes "live" from one side of the Earth to the other, and then to link up computer terminals in different parts of the world. The use of digital transmission and multiplexing techniques ***[28]***______________ an enormous increase in the capacity of satellites. ***[29]***

The international organization INTELSAT was created in 1964 to provide international communication service by satellite. 109 nations are members of INTELSAT. Between 1979 and 1983 the traffic of INTELSAT doubled; However, its communications charges ***[30] went down***, despite a 73 % rise in the worldwide cost of living index.

22) Only ONE answer is ***FALSE*** according to the text. Mark it.
- [✓ a)] The first satellites were seen by people living in isolated areas of the world.
- b) The first satellites were used in order to communicate people living in isolated areas of the world.
- c) The first satellites served to communicate people who lived in isolated areas of the world.
- d) The main purpose of the first satellites was to communicate people who lived in isolated areas of the world.

23)
- [✓ a)] As a result
- b) Because of
- c) So
- d) As

24) Mark the ***FALSE*** option.
- a) Since the cost of satellites decreased they have to compete with submarine cables.
- [✓ b)] Since the cost of satellites went down steadily, satellites became cheaper than submarine cables.
- c) Due to a decrease on the price of satellites they have to compete with submarine cables.
- d) Since the cost of satellites decreased they are seen as competitors with submarine cables.

25) "***Consequently***" means the same as:
- a) However
- b) Although
- [✓ c)] Thus
- d) Because of

26) "***Between the two***" refers to:
- a) optical fibre and undersea cables
- [✓ b)] satellites and submarine cables made of optical fibre
- c) continents
- d) satellites and circuits

27) Satellites were soon used to:

[✓ a) broadcast TV programmes "live" in different parts of the world]
b) connect computer terminals
c) send out one side of the Earth to the other
d) to link up one side of the Earth with satellites

28) a) was caused
b) resulted
c) produced by
[✓ d) has led to]

29) Choose the option that is ***FALSE***.

a) The capacity of satellites has increased thanks to the use of digital transmission and multiplexing techniques.
b) The use of digital transmission and multiplexing techniques has contributed to enlarge the capacity of satellites.
[✓ c) The use of digital transmission and multiplexing techniques has increased and so has the capacity of satellites.]
d) An enormous increase in the capacity of satellites has been observed due to the use of digital transmission and multiplexing techniques.

30) ***"went down"*** means the same as:

a) slowed down
b) increased
c) became more expensive
[✓ d) fell]

IV. Choose the correct answer. Only one is correct.

FUTURE PRESENT

31.- That piece of metal__________ if you heat it.
a) would melt c) have melted
[✓ b) will melt] d) melted

32.- The engine has______________. It needs to be repaired.
a) broken off c) broken in
b) broken up [✓ d) broken down]

33.- *A tube used for the detection of radiations which has been previously filled with gas* is:
a) a gas tube-radiations detecting
b) a radiation detecting gas tube-filled
[✓ c) a gas-filled radiation-detecting tube]
d) a gas-filled detecting radiations tube

34.- "efficiency" is equivalent to:
a) effective c) effectivance
[✓ b) effectiveness] d) effectiveful

35.- The obtained results "*have not been sufficiently estimated by the research group*". They have been:
[✓ a) underestimated] c) disestimated
b) overestimated d) unestimated

36.- We are losing a lot of money because we cannot____________ costs.
a) take off [✓ c) cut down]
b) set up d) put away

37.- The printer will not work if you don't ________________.
[✓ a) plug it in] c) switch on it
b) switch it off d) plug it out

38.- "miscalculated" means:
a) too many calculations c) calculated twice
b) not calculated [✓ d) calculated badly]

39.- We had to______________ when we saw there was an accident on the road.
a) slow on c) speed up
[✓ b) slow down] d) speed down

40.- *A connector which has three leads* is:
a) a three-leads connector
[✓ b) a three-lead connector]
c) a three-conector lead
d) three-leads connectors

41.- The opposite of "unable" is:
a) impossible [✓ c) capable]
b) probable d) stable

42.- *Condensers that are cooled by air* are:
[✓ a) air-cooled condensers] c) air-cooling condensers
b) cool-air condensers d) cooled-air condensers

43.- If our computer had worked quicker______________________.
a) we might would finish
b) we would finish earlier
c) we could finish earlier
[✓ d) we would have finished earlier]

44.- What is a "*radiating transmission line*" ?
a) It is a line for the transmission of radiation
b) It is the transmission of the line that radiates
c) It is a radiation of the transmission line
[✓ d) It is a line for transmission which radiates]

45.- That German scientist discovered a new chemical formula.
[✓ a) found out] c) set up
b) looked after d) gave up

46.- The discovery of penicillin was a very important__________.
a) output c) breakdown
[✓ b) breakthrough] d) outbreak

47.- You are not allowed to take this exam ______________you show me your identity card.
a) if [✓ c) unless]
b) provided d) in case

48.- A screw in the engine is getting loose due to the vibration produced.
a) loosened c) is losing
b) is lost [✓ d) is loosening]

49.- a) If you are in the third and you pass all your courses, then you'll be a licence in Engineering next year.
[✓ b) If you are a third-year student and you pass all your courses, then you'll take your degree in Engineering next year.]
c) If you are in the third course and you pass all your years, then you'll finish your career in Engineering next year.
d) If you are in your third year and you pass all your courses, then you'll get your title in Engineering next year.

50.- You will pass your English exam______________ you study hard and show you have learnt to read and understand technical texts.

[✓ a) provided]
b) unless
c) in case
d) otherwise

51.- Only one of these does not mean the same as "ONLY IF". Which one?

a) provided
b) on condition that
[✓ c) unless]
d) as long as

52.- Make sure you have a fire extinguisher nearby ___________ there is a fire in the lab.

a) in case of
[✓ b) in case]
c) in the event of
d) otherwise

53.- You should be extremely careful when dealing with dangerous substances. ______________, you might get hurt.

a) Provided
b) In case
c) Only if
[✓ d) Otherwise]

54.- [✓ a) If I were you, I would take English more seriously.]
b) I will take English more seriously if I had been you.
c) If I was you, I would have taken English more seriously.
d) If I were you, I should have taken English more seriously.

55.- One of these can be used in this sentence. Which one?
"_____________you are connected to the network, you won't be able to use the electronic mail service".

[✓ a) Unless]
b) Provided
c) Only if
d) On condition that

56.- That engineer will not refuse to work for that company if they offer him twice as much.
"IF" cannot be susbstituted by:

a) in case
b) only if
c) on condition that
[✓ d) unless]

V.- Read the text and then answer the questions. Only one answer is correct.

FIBER OPTIC COMMUNICATIONS.

In 1966, Dr. K.C. Kao, a research scientist at ITT's Standard Communication Laboratories in England, proposed that low-loss silica fibers would provide the means to *[57]*______________________________. That proposal marked the beginning of the era of practical lightwave communications. When Dr. Kao made public his proposal, the attenuation of the existing glass fibers was measured in thousands of decibels per kilometre. By 1970, Corning achieved an attenuation of 20 dB/Km in an ultrapure fiber. *[58] This achievement stimulated an intense competition that pushed fiber loss lower and lower.* Finally, in 1979, a sicentist at Japan's Nippon Telegraph and Telephone Public Corporation announced the development of a silica fiber having a loss of only 0.2 dB/km, the *[59]*______ lower limit for silica.

All this means that a 3-dB/Km glass fiber which is 1 km long attenuates only half the light injected into one end. In other words, if *[60]*___________ a miliwatt of optical radiation into one end of a 1-km fiber, you would receive half a miliwatt at the other end. Soli-state detectors can easily detect signals having an amplitude of only a few tens of nanowatts and less, so it is possible to transmit high quality data for 10 Km or more over a 3-dB/Km fiber without the need for a repeater.

This capability allows *[61]*_____________ to outperform conventional metallic cables and wave guides. Although fibers are not yet fully cost competitive with metallic conductors, they are much lighter and smaller, therefore, much easier to transport and ***[62] instal***.

However, the best way to understand how fiber optics communication network operates is ***[63] to view*** it as a natural extension of the present telephone system. In the early telephone systems, a sensitive membrane in the headset translated the pressure changes that were caused by the human voice into a series of alternations in an electric current. The pattern of electrical changes passed along a series of copper wires and *[64]*______________________ to the receiver of the other telephone, where the electrical signal ***[65] was changed back into*** the sound of a voice.

Nowadays, in order to accommodate all the telephone calls, computer-to-computer talk, and satellite transmissions, the mechanisms between the two telephone receivers have changed a lot. Although voices are still converted from *[66]*____________________ into electrical signals, the signals do not travel as a smoothly varying flow of current; instead, they are turned into digital information --on and off pulses alternating at the rate of thousands per second-- and then mixed up with hundreds of other conversations. *[67] Computers within the telephone system unsort all the mixed-together digital messages as they approach their destinations.*

Even our sophisticated modern system has a limiting factor: the digitized flow of electrons over metal wires has a certain message-carrying capacity, and ***[68] this*** restricts the ***[69] thickness*** and the speed with which the messages can be sent. However, when pulses of light are subsituted for the *[70]*___________ charges, with optical fibers substituting for the metal wires, the maximum limit for information flow ***[71] increases*** dramatically. *[72] The immense difference in information-carrying capacity (known as bandwidth in the jargon) is due to the much higher frequency of light waves.* Audible sound *[73]*_____________ air pressure oscillations in the 20-20,000 Hz range. However, light vibrates in the 10 to 10 Hz range.

57.- *"Communication by means of guided waves over long distances"* is:
a) long-wave guided distance communication
[✓ b) long-distance guided wave communication]
c) communication long-distance guided waves
d) guided-waves long-distances communication

58.- *"This achievement stimulated an intense competition that pushed fiber loss lower and lower"* means:
[✓ a) Scientists started to compete in order to find a kind of fiber whose loss was very low.]
b) People started to compete in the price of fiber.
c) People started to compete to make people buy fiber.
d) Scientists tried to reactivate research in optical fiber because it was going down.

59.- a) theorize b) theory [✓ c) theoretical] d) theoretically

60.- a) you had launched c) you launch
b) you would have launched [✓ d) you launched]

61.- *Fibers which have a very low loss* are:
[✓ a) low-loss fibers] c) low fibers loss
b) loss low fibers d) fibers low-loss

62.- *"to instal"* has a synonym in:
a) to push in c) to fix up
[✓ b) to set up] d) to connect to

63.- According to the text *"to view"* means:
a) to look after [✓ c) to look at]
b) to look for d) to look up

64.- a) electrical-switching stations
b) electric-switched stations
c) electronic switch stations
[✓ d) electronic-switching stations]

65.- *"was changed back into"* means:
[✓ a) was converted] c) was moved back
b) was gone back d) was directed to

66.- *Fluctuations due to the pressure of air* are:
a) air fluctuation pressure [✓ c) air-pressure fluctuations]
b) fluctuation air press d) pressure-air fluctuations

67.- Only one sentence is **TRUE** according to the text (Lines 32-34).
a) All the mixed together digital messages are grouped by computers while they approach their destinations.
[✓ b) Computers in the telephone system separate all the mixed-together digital messages when they approach their destinations.]
c) As computers in the telephone system approach their destinations, they separate all the mixed-together digital messages.
d) All the mixed-together digital messages are linked by computers in the telephone system whereas they approach their destinations.

68.- The word "*this*" (line 36) refers to:
a) the metal wires
b) the digitized flow of electrons
c) the sophisticated modern system
[✓ d) the specific message-carrying capacity]

69.- "*thickness*" (line 37) in the text means:
a) the number of factors [✓ c) the number of messages]
b) the number of wires d) the number of electrons

70.- [✓ a) electrical] c) electric
b) electronic d) electronics

71.- Choose a verb whose meaning is the opposite of "*increases*" in the text:
a) is put down c) is lifted
[✓ b) goes down] d) is lowered

72.- According to lines 39-41, only one of these statements is **FALSE**:
a) The difference in the bandwidth depends on the frequency of light waves.
b) The difference in the information-carrying capacity is affected by the frequency of light waves.
c) The high frequency of light waves is what causes an important difference in the bandwidth.
[✓ d) The frequency of light waves is due to the immense difference existing between the information-carrying capacity and the bandwidth.]

73.- a) is produced [✓ c) is caused by]
b) is resulted in d) cause

`VI. Read the text carefully and choose the right option.`

VALVES.

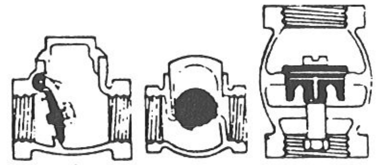
Definition.- A valve is a device which *[74]*____________________ flow control. This text deals with valves for fluids, liquids and gases. The function of a valve is *[75]*_____________ the flow of liquids in piping systems and machinery. In machinery the flow phenomenon frequently has a pulsating or intermittent character and the valve, with its associated gear, provides a timing feature. This particular text does not deal with electrical valves.

Types of valves.- There are many different types of valves in operation --each one designed ***[76] to perform*** a specific function. This section will consider some types from the point of view of design, construction and function. Four particular valve types are commonly used in piping systems. Each is illustrated below and each has its own distinctive features and applications. Gate valves are usually used for throttling, i.e. regulating flow. On the other hand, glove valves are adaptable to throttling operations and are often fitted with a renewable disk. Check valves are used *[77]*________________ flow automatically to a single direction in a piping system while plug valves operate in the open or closed position by turning the plug through 90° with a shearing action. This *[78]*_________________________ foreign matter from the seat.

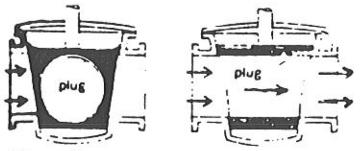
Valve features and materials.- Some of the most common structural features of pipe valves are: outside stem and yoke, packless construction; angle; power instead of manual operation; and combined non-return and stop-valve arrangements. These valves may also be made from a variety of materials, depending on their particular function and the stress they undergo during operation. Brass and bronze are usual in valves for general service. Cast iron may be used *[79]*_________ there are low steam pressures (less than 250 psi) and temperatures, or hydraulic pressures below 800 psi. However, steel and alloy steels ***[80] are required*** for the highest operating pressures ***[81] such as*** 5000 psi and 1200° F steam. Special metals ***[82] must be used*** where there are chemical and process applications.

Safety and relief valves.- They are automatic protection devices for the relief of too much pressure. They must open automatically when the pressure exceeds a predetermined value and they must ***[83] allow*** the pressure to drop a predetermined amount before closing in order to *[84]*_____________ chattering, instability and damage to the valve and valve seat. They must have adjustement features for both the relieving and blowdown pressures and, finally, they must be tamperproof after setting.

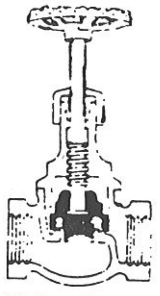
[85]



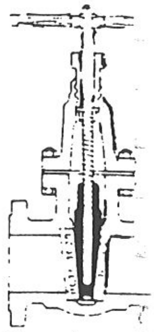
_________________________ ?



Plug valves



Globe valve



Gate valve

74) a) serves ~~for to~~
[✓ b) is responsible for]
c) used ~~to~~ FOR
d) function is to THE FUNCTION OF — IS TO...

75) a) so as to regulati~~ng~~
b) in order to regulate
[✓ c) to regulate]
d) for regulating

76) **"to perform"** has a synonym in:
a) to serve
b) to function
c) to make up
[✓ d) to carry out]

77) One of these ***cannot be used*** in the sentence. Which?:
[✓ a) for ~~to limit~~ LIMITING]
b) for limiting
c) in order to limit
d) so as to limit

78) a) enables that the plug clears
[✓ b) enables the plug to clear]
c) enables to clear the plug
d) enables the plug ~~from~~ FOR clearing

79) a) that QUE b) which CUAL c) whose CUYO [✓ d) where] DONDE

80) **"are required"** has a synonym in:
a) result from
b) are allowed
[✓ c) are needed]
d) are prevented

81) **"such as"** can be substituted by:
[✓ a) like]
b) an example of
c) that is
d) namely

82) **"must be used"** could be substituted by:
a) are recommended to be used
[✓ b) are required to be used]
c) are likely to be used
d) are expected to be used

83) **"allow"** could be substituted by:
a) force
b) avoid
c) cause
[✓ d) enable]

84) a) cause [✓ b) avoid] c) force d) enable

85) According to the text there are four kinds of valves. What is the name of the ones which have remained nameless?
a) Electrical valves
b) Relief valves
[✓ c) Check valves]
d) Pipe valves

VII. After reading the following text carefully, choose the right option.

SUPERCONDUCTIVITY.

The resistance of metals varies with their temperature. When they get hot, their resistance increases. When they cool, their resistance falls. The resistance of some metals and alloys steadily decreases when their temperature is lowered, then falls suddenly to a negligible value at temperatures a few degrees above absolute zero (-273°C). In other words, these materials have almost no resistance to an electric current at very low temperatures. They become almost perfect conductors. This [86]______________ superconductivity. It occurs only with certain materials, for example lead, and only at very low temperatures. [87]

The practical applications of superconductivity are limited [88]________________ the very low temperatures required. However, a number of uses have been proposed. If a current is induced by a magnetic field in a ring of superconducting material, it [89]______________ to circulate when the magnetic field is removed. In theory this could be made use of in the memory cells of computers. Memory cells [90] ***made*** of superconducting materials could store information indefinitely. [91] ***Consequently,*** owing to the zero resistivity of the cells, the information could be retrieved very quickly, as fast as 10^{-8} seconds.

A high percentage of the total losses in modern transformers is [92]______________ the resistance of the windings. Transformers could be made with windings cooled to the low temperatures [93]______________ superconductivity occurs. The resistance of the windings would be zero and the transformer would be almost ideal. Similarly a 100 % effcient motor has been proposed using the magnetic field of superconducting coils. [94]

86) a) is known AS c) can be classified according to
[✓ b) can be defined as] d) is called ~~as~~

87) Mark the only statement that is ***TRUE*** according to the first paragraph.
[✓ a) Since the temperature of metals varies, their resistance also varies. The lower their temperature, the better conductors they are.]
b) As a result of the resistance of some metals, their temperature falls.
c) Due to the resistance of some metals, some materials become perfect conductors.
d) As some materials at high temperatures show no resistance to electricity, they become perfect conductors.

88) a) because c) since
[✓ b) because of] d) as

89) a) would continue [✓ c) will continue]
b) would have continued d) had continued

90) **"made"** can be substituted by:
[✓ a) which are made] c) which made
b) which are making d) which makes

91) *"Consequently"* means the same as:
a) The reason why   c) However
b) Nevertheless   [✓ d) Therefore]

92) a) as a result of   [✓ c) due to]
b) as   d) since

93) a) at that   c) at whom
[✓ b) at which]   d) at whose

94) Mark the only statement which is *TRUE*, accordig to the third paragraph.

- **[✓ a) The resistance of the windings is what causes most of the losses in transformers.]**
- **b) Transformers are cooled at 0ºC.**
- **c) Transformers would be perfect if they used windings.**
- **d) The use of superconducting coils in the resistance of a motor at low temperatures has been proposed.**

VIII.Read the text and choose the right option.

WATER TREATMENT.

People need water which is clear and free from [95]____________________. They also desire water which is soft, free from tastes and odors, and does not discolour in plumbing fixtures or corrode metals. Industry requires water that will not interfere with its processes. Recently there has been [96] ***increasing concern*** about the presence of small quantities of organic material, particularly chlorinated hydrocarbons, which are thought to cause agents of a variety of diseases. [97] ***Such contaminants*** are known to be present in many water supplies although their effect on health is [98]__________. Standard disinfection practice using chlorine contributes to the production of these compounds.

Chlorine in its various forms has been widely used [99]_____ disinfecting water. It is cheap, reliable and presents no great difficulty in handling. [100] *Chlorine is a very active element and when it is added to water as free chlorine it will combine with organic and inorganic matter and oxidize some organic and inorganic compounds. The chlorine in water in chemical combination with ammonia or other nitrogenous compounds which modify its rate of bactericidal action is known as the combined available chlorine*. Chlorine is used in water treatment for disinfection, prevention and destruction of odors, iron removal and colour [101] ***removal***. While its principal use is as a disinfectant, the mechanism of its bactericidal action is [102] ***uncertain***. The bacterial efficiency of chlorine [103]________________ if pH values and low temperatures are used.

Chlorination of water is practised for the purposes mention before. Chlorine is classified according to its point of application and its end result.

Plain Chlorination.- In some cities surface waters are used only with a chlorination treatment, although in some of these cities long storage is also given. In those cases, chlorination is extremely important because it may be the principal or even the only safeguard against disease. [104]____________, untreated waters are likely to be very high in inorganic matter and require high dosages and long contact periods for maximum safety. The chlorine may be added to the water in the pipe which leads from a reservoir to the city.

Prechlorination.- This is the application of chlorine before any other treatment. The chlorine may be added in the suction pipes of [105]________________ or to the water when it enters the mixing chamber. Its use in this manner has several advantages. It may improve coagulation and will reduce tastes and odours caused by organic sludge in the sedimentation rank. The combination of prechlorination with postchlorination [106]_____________ advisable or even necessary if the raw water were highly polluted.

Postchlorination.- This usually refers to the addition of chlorine to the water after all other treatments. The chlorine may be added in the suction line of the service pump, but it is [107] ***preferable*** to add [108] ***it*** in the filter effluent pipe or in the clear well so that an adequate contact time will be assured. This should be at least 30 minutes before any of the water is consumed if only postchlorination [109] ***is given***. Greater residual plants will probably be needed if it is desired to hold a disinfecting effect in all the distribution system. [110] ***This*** is considered desirable since it allows protection against contamination from cross connections and prevents organic growths in mains and their resulting odors. [111]

95) .- *Organisms* *which cause* *diseases* are:

WHICH CAUSE = CAUSING

a) disease-caused organisms
[✓ b) disease-causing organisms]
c) cause~~d~~-disease organisms
d) causin~~g~~-diseases organisms

96) .- "***increasing concern***" means:
a) there are more quantitites of organic material
b) industry is augmenting
[✓ c) people are becoming more and more worried]
d) there are more diseases

97) .- "***Such contaminants***" refers to:
a) water supplies
b) chlorine
c) compounds
[✓ d) chlorinated hydrocarbons]

98) .- [✓ a) unknown] b) knowledge c) knowable d) knowing

99) .- One of these cannot be used in the text:
a) in b) for c) when [✓ d) to]

100) .- Only one of these is TRUE according to lines 10-14:
[✓ a) The combined available chlorine is the chemical combination that ammonia or other nitrogenous compounds together with chlorinated water produce and which changes the percentage of the bactericidal action.]
b) Chlorine is a chemical combination of ammonia or other nitrogenous compounds with water.
c) The combined available chlorine is the chemical reaction of chlorine in water with organic and inorganic compounds.
d) Chlorine is used in water treatment to oxidize some organic and inorganic compounds.

101) .- "***removal***" means the same as:
[✓ a) suppression] c) change
b) movement d) introduction

102) .- One of these cannot substitute ***"uncertain"*** in the text because of the meaning:
a) doubtful [✓ c) probable]
b) not certain d) variable

103) .- a) would been reduced c) would have reduced
[✓ b) will be reduced] d) reduce

104) .- a) Unless [✓ c) Otherwise]
b) Provided d) As long as

105).- *Pumps for water which is raw* are:
a) water-raw pumps
[✓ b) pumps water raw]
[✓ c) water pump-raw]
[✓ d) raw-water pumps]

106).- [✓ a) would be] c) will have been
b) would have d) should have being

107).- ***"preferable"*** cannot be substituted by:
a) better [✓ c) likely]
b) advisable d) convenient

108).- ***"it"*** refers to:
a) the suction line c) the filter effluent pipe
b) the service pump [✓ d) chlorine]

109).- ***"is given"*** in the text means the same as:
a) is affected c) is considered
[✓ b) takes place] d) is prevented

110).- ***"This"*** refers to:
a) contamination c) the distribution system
[✓ b) disinfecting effect] d) residual plants

111).- According to the last three paragraphs, which is FALSE?
a) Plain chlorination is used mainly in the pipes that come from a reservoir and lead to the city.
[✓ b) Prechlorination is used in the suction pipes of pumps reducing tastes and odours. It can be combined with Plain chlorination.]
c) Postchlorination is used after all other water treatments. It is also added in pipes and prevents from contamination and organic growths.
d) If the water were highly polluted, it is advisable to use more than one water treatment, for example prechlorination and postchlorination.

TEST 2

I. Choose the right option. Only one is correct.

1.- "Ought to" is a synonym of:
a) must
[✓ b) should]
c) may
d) can

2.- In order to write a successful program, a programmer________ plan the program first.
a) could
b) may
[✓ c) should]
d) must ~~to~~

3.- Choose the verb that indicates the same degree of probability as that in the underlined expression:
"That diskette is certain to have a virus. You have used it in many different PCs and now it isn't working properly"
a) can
b) might
c) should
[✓ d) must]

4.- Are those the colleagues__________________________?
a) for who you worked
b) with who you worked
c) for whom you worked with
[✓ d) with whom you worked]

5.- This effect occurs in materials___________ tensile strength is very low.
a) that
[✓ b) whose]
c) by means of which
d) who

6.- Many people________ live in isolated areas are now using electronic mail and the fax service.
[✓ a) that]
b) whom
c) which
d) whose

7.- Only one of these is not correct. Which one?
a) The book he wrote was a best-seller
b) the book that he wrote was a best-seller
c) The book which he wrote was a best-seller
[✓ d) The book who he wrote was a best-seller]

8.- The function of (the barometer) is TO + ____________ atmospheric pressure.
[✓ a) to supply]
c) supplying
c) for supplying
d) for ~~to~~ supply

9.- In the lab you should wear gloves__________protect your hands.
- a) for + V.ING
- b) so that +V.ING
- [✓ c) so as to]
- d) to avoid +V.ING

10.- Although electronic devices seem complicated, they________ common basic units connected together.
- a) are composed by
- [✓ b) are made up of]
- c) are divided as
- d) consists of

11.- In an integrated circuit (IC), a transistor is the device which________________ amplifying electric signals.
- a) serves to
- b) is used in order to
- c) is responsible to
- [✓ d) performs the function of]

12.- Dielectric materials are classified______________ their dielectric constant. The greater the dielectric constant, the greater the capacitance.
- a) into
- [✓ b) according to]
- c) on the basis FUNDACIÓN
- d) as

13.- In an electric circuit, if you close the switch you______________________ through the coil.
- [✓ a) allow current to flow]
- b) allow that current flows
- c) allow current from flowing
- d) allow current flowing

14.- One of the following IS NOT a synonym of "ENABLE". Which one?
- a) Allow
- b) Let - DEJAR
- c) Permit
- [✓ d) Cause]

15.- The recording of data____________________________.
- a) avoids data from being cleared
- [✓ b) prevents data from being cleared]
- c) stops data being cleared
- d) prevents data to be cleared

16.- DC motors are used for cranes_____________ their speed can be well controlled.
- a) due to
- b) because of
- [✓ c) since] /AS /BECAUSE + CLAUSE
- d) so

17.- Several buildings collapsed____________ the earthquake.
- a) as a result OF
- [✓ b) because of]
- c) as
- d) thus

18.- If you__________ an object in a changing magnetic field, then an electrical voltage would be created in the object.
- a) had placed
- b) place
- c) will place
- [✓ d) placed]

19.- If I had taken English more seriously at University, I____ ______________________ so many problems with my job some years ago.
- [✓ a) would not have had]
- b) will not have
- c) did not have
- d) would not have

20.- ONE of the following CANNOT BE USED in the sentence:
"This material will probably melt____________________the temperature is high enough. If t doesn't melt, we won't be able to use it."

a) provided that | AFIRM. [✓ c) otherwise] SI NO (NEG)
b) as long as d) only if

21.- You won't be able to keep all that information in the computer *if you don't* register it in the hard disk memory.
The words UNDERLINED could be substituted by:

a) only if you c) provided you
[✓ b) unless you] (IF ... NOT) d) in case of

22.- The alarm should sound____________ there is a fire. OF + NOUN/(GERUND)

[✓ a)in case] b)in case of c)unless (NEG) d)in the event of

23.- *"Chemicals which are constructed synthetically"* are:

a) constructed synthetically chemicals
b) chemicals constructed synthetically
c) synthetically-construct~~ing~~ chemicals
[✓ d) synthetically-constructed chemicals]

24.- *"An airport which has five-terminal~~s~~"* is:

a) a terminal-five airport
b) a five-terminal~~s~~ airport
[✓ c) a five-terminal airport]
d) an airport five-terminal X

25.- After having studied for four years, he ***gave up*** Engineering.

[✓ a) abandoned] c) postponed
b) interrupted d) continued

26.- We are losing a lot of money because we cannot____________ costs.

a) find out b) set up [✓ c) cut down] d) slow down

27.- Apple has released a new kind of pocket machine capable of receiving and sending e-mails and of recognizing a man's handwriting. This is going to be a major____________ in the world of minicomputers for everyday use. Lots of businessmen will use them in the street.

a) outcome c) layout
[✓ b) breakthrough] d) outstanding

28.- "Not to like" means:

a) to unlike [✓ c) to dislike]
b) to non-like d) to mislike

29.- That machine is________________. It will break down one of these days.

a) non-worked c) underworked
b) misworked [✓ d) overworked]

30.- "The design was produced ***without much care***" means:

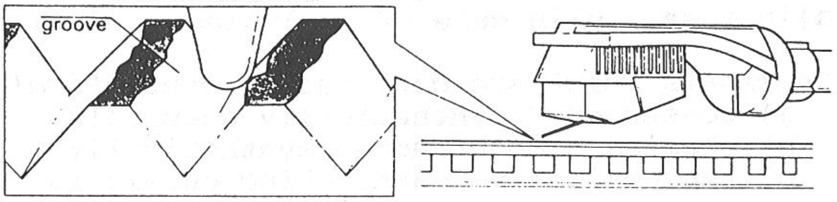
a) carefully c) careless
[✓ b) carelessly] d) careful

II.- Read the following text and choose the right option.

AUDIO RECORDING SYSTEMS.

For a long time hi-fi recordings have been produced on vinyl gramophone records. They use an analogue recording system, which stores patterns by cutting a continuous groove in a vinyl disk. The shape of the sides of the groove represents the audio pattern. The sound [31]________________ by spinning the record and using the movement of a metal needle in the groove to produce [32]___________________ (see Fig. 1). These magnetic fields are then processed to produce the sound. A typical LP (long-playing record) has a recording capacity of about 45 minutes.

The stylus vibrates in the groove and recreates the recorded sound.



A digital recording system, [33]______________ a compact disc (CD) system, was introduced in 1982. This uses a [34]___________________ in which a laser beam reads marks on the surface of a [35]_____________________. It gives near-perfect reproduction of sound and the sound quality does not deteriorate with use. Some of the problems associated with vinyl records are eliminated ***[36] such as*** *"crackle",* ***[37] caused by*** *dust and static, and "jumping", [38]___________ scratches on the recording surface.*

In a CD system, a recording is made by electronically sampling he sound 44,100 times every second. The electronic samples are used to control a laser beam, ***[39] which makes*** *a pattern of very small pits in the surface of the perspex disc. The audio pattern is represented by the length of the pits and the distance between them. The pits are arranged in circular tracks. A typical CD has about 20,000 circular tracks and a [40]__________________ of 74 minutes.*

To play back the recording, the disc is made to revolve at a constant speed and a laser beam is directed at its surface. The varying reflection of the laser beam is fed into a digital-to-analogue converter (DAC). This produces the electronic signals, which are amplified to drive a loudspeaker. [41]

31.- a) can being reproduced [✓ c) can be reproduced]
b) have being reproduced d) would reproduce

32.- "*magnetic fields which vary*" are:
- a) magnetic field varying
- [✓ b) varying magnetic fields]
- c) varied magnetic fields
- d) magnetic-varying field

33.- One of these CANNOT BE USED in that sentence:
[✓ a) namely] c) named
b) called d) known as

34.- *"an optical mechanism by means of a laser"* is a:
a) mechanism optical laser
b) laser mechanism optical
c) optical mechanism lasers
[✓ d) laser optical mechanism]

35.- ***"a disc made of perspex which is specially prepared"*** is:
a) a specially-preparing perspex disc
[✓ b) a specially-prepared perspex disc]
c) a perspex disc specially-prepared
d) a perspex special disc prepared

36.- ***"such as"*** could be substituted in that sentence by:
[✓ a) like] c) that is
b) an example of d) namely

37.- ***"caused by"*** can be substituted by:
a) which is causing c) which results in
[✓ b) which is caused by] d) which results

38.- a) because [✓ c) due to]
b) as d) since

39.- ***"which makes"*** could be substituted by:
[✓ a) making] c) made
b) that make d) who makes

40.- a) recording maximum capacity
b) maximum capacity recording
c) recording capacity maximum
[✓ d) maximum recording capacity]

41.- Only **ONE** of these is **FALSE**, according to the last two paragraphs:

a) In a CD system the electronic samples used for a recording regulate the laser beam that creates a pattern of pits.

b) The length of the pits and the distance between them is what represents the audio pattern of a CD when a laser beam at constant speed is directed at its surface.

[✓ c) The electronic signals the laser beam creates, when it is directed at the surface of a CD, are amplified in the loudspeaker.]

d) A digital-to-analogue converter receives the changing reflection of the laser beam, when it is directed at the surface of a CD, and produces the electronic signals which have to be amplified to drive a loudspeaker.

III. Read the text carefully and choose the right option.

COMMUNICATION SATELLITES IN THE WORLD OF TELECOMMUNICATIONS.

Low orbit satellites (LOS) *--the typical height of which varies from 150 to 450 kilometres-*
(2) *are of little use for telecommunications* ***[42] as*** *they are only in line of sight of each*
*earth station for about 15 minutes **[43]**. Their rotation period around the Earth is about*
(4) *one and a half hours and their main use is for remote sensing, a field in which digital,*
*processing techniques have shown to be specially valuable. **[44]***

Medium altitude satellite (MAS) *are used for telecommunications, especially in countries which cover a vast geographical area like the URSS. They "fly" at a typical height of 9,000 to 18,000 kilometres and they are in line of sight of the earth station for between two and four hours.*

The most important type of satellite for telecommunications is the geosynchronous, or
geostationary satellite *positioned over the Equator at a height of 35,800 kilometres. Its*
rotation period is 24 hours, the same as the Earth's and, consequently, seen from the
(13) *Earth. This type of satellite appears to be **[45] motionless** in the sky. It is within line*
of sight of an earth station for its entire life.

(15) *A satellite can handle large amounts of traffic which it can send over vast areas of the*
*Earth. **[46] Therefore**, it represents a relatively cheap way of transmitting information over long distances. For countries which do not already have sophisticated cable or microwave networks, the use of a satellite can be extremely beneficial as it can be used in their place.*

(20) *The first satellites were seen as a way of communicating with people who lived in isolated*
*areas of the world. **[47]**______________, earth stations began to appear in the remotest*
*parts of the globe. The cost of satellite communication began to **[48] fall** steadily and,*
consequently, satellites have to compete with submarine cables as a way of connecting
continents cheaply. However, with the arrival of optical-fibre undersea cables, a more
(25) *balanced division of intercontinental circuits between the two is **[49] likely**. Satellites*
were soon used to broadcast TV programmes "live" from one side of the Earth to the
*other, and then **[50] to connect** computer terminals in different parts of the world. The*
*use of digital transmission and multiplexing techniques **[51] has led to** an enormous*
increase in the capacity of satellites.

The international organization INTELSAT was created in 1964 to provide international
communication service by satellite. 109 nations are members of INTELSAT. Between 1979
(32) *and 1983 INTELSAT's traffic doubled; however, its communication charges went down,*
despite a 73 % rise in the worldwide cost of living index.

42.- **"as"** (line 2) could be substituted by:
a) owing to
b) because of
c) due to
[✓ d) since]

43.- Only ONE of the following statements is TRUE. Mark it. (lines 1-3).

a) LOSs are not very useful for telecommunications if their line of sight is around 15 minutes.

b) LOSs are only used for telecommunications when they are small due to the fact that their line of sight of an earth station is approximately 15 minutes.

[✓ c) Since the line of sight of LOS is about 15 minutes, they are practically of no use for telecommunications.]

d) Although the line of sight of LOSs is about 15 minutes, they are often used for telecommuications.

44.- Only ONE of the following statements is TRUE. Mark it. (lines 3-5).

a) Remote sensing is a very special field.

b) It has been shown that digital, processing techniques are quite valuable in the field of remote sensing.

c) The field of remote sensing has been developed due to the digital, processing techniques.

[✓ d) Digital, processing techniques have shown that the field of remote sensing is highly valuable.]

45.- "***motionless***" (line 13) means:

a) quiet
b) moving
c) slowly
[✓ d) unmoved]

46.- "***Therefore***" (line 16) has a synonym in:

a) For
b) Nevertheless
[✓ c) Consequently]
d) However

47.- [✓ a) As a result, —]
b) As a result of + NOUN/GERUND
c) Since —
d) The reason why —

48.- "***fall***" (line 22) has a synonym in:

[✓ a) decrease]
b) improve
c) go off
d) increase

49.- "***likely***" (line 25) has a synonym in:

a) similar
b) positive
[✓ c) probable]
d) agreeable

50.- "***to connect***" (line 27) means:

a) to line up
[✓ b) to link up]
c) to feed up
d) to pick up

51.- "***has led to***" is equivalent to three of the following four meanings. Mark the WRONG one.

a) has resulted in
b) has brought about
c) has given rise
[✓ d) has resulted from]

52.- Only ONE of the following statements is CORRECT. Mark it. (lines 31-33)

a) Since INTELSAT's traffic doubled, its communication charges went down.

b) INTELSAT's communications charges went down due to the fact that the cost of living rose.

[✓ c) Although the cost of living rose, INTELSAT's communication charges went down.]

d) INTELSAT's traffic doubled, although its communication charges went down.

IV. - Read the text carefully and choose the right option.

CORROSION.

Corrosion attacks all engineering materials. Corrosion is any chemical action which harms the properties of a material. It reduces the life of a material and increases the cost of the structure. For example, a steel bridge must be repainted regularly [53]__________ rusty. [54]________________ , various metals have been developed to resist corrosion. Among them are the [55] ***stainless steels.*** *These metals contain from 12 to 35 % chromium which forms a very thin layer or film of chromium oxide on the surface of the metal. This film protects the metal from corrosion. Alloys made from copper and nickel are also corrosion-resistant. For example Monel metal, which contains 60 % nickel and 30 % copper more or less, is resistant to both fresh and salt water corrosion. [56]_______________ , it is used for marine engine parts, and for other surfaces like ship propellers which are in contact with sea water. Cupronickels, which contain a smaller proportion of nickel, have a similar resistance to fresh and sea water. They are mainly used to make tubes. [57]*

[58] If two dissimilar metals touched each other in the presence of moisture, corrosion would be produced. This type of corrosion [59]______________ galvanic or electrolytic corrosion because it has an electrical cause. The metals and the moisture act like a weak battery and the chemical action which [60] ***results from*** *that corrodes one of the metals. If, for example, aluminium sheets are riveted with copper rivets, the aluminium near the rivets [61]__________________ in damp conditions.*

No material can be completely corrosion-resistant. Even stainless steels will corrode. However, engineers can fight corrosion. For example, they can use high-purity metals because these metals are more resistant than alloys. They can also make sure that two [62] ***dissimilar*** *metals are not allowed to touch each other. Finally, engineers can protect the surfaces of the metals in many different ways. One of the most common methods is to paint them. [63]*

53).- a) to allow it to become
[✓ b) to avoid becoming] TO AVOID + V.ING
c) to enable it to become
d) to prevent it to become

54).- One of the following CANNOT BE USED in this sentence. (line 4) Which one?
a) Therefore
b) For this reason
[✓ c) Because of]
d) Hence

55).- What is a "*stainless steel*" ?
[✓ a) a kind of steel that does not become stained]
b) a kind of steel that loses colour
c) a kind of steel that can be discoloured
d) a kind of steel that can stain

56).- a) Since
b) As
[✓ c) Consequently]
d) Due to

57).- According to the **first paragraph**, which of these statements is **TRUE** ?

a) Alloys made from copper and nickel are the only metals capable of resisting corrosion.
b) Monel metal is a resistant corrosion alloy which contains less nickel than Cupronickels and can be used for the engine parts of ships.
[✓ c)] Cupronickel is an alloy which can resist corrosion when it is in contact with fresh and sea water, even though it has less nickel than Monel metal.
d) There are only two kinds of metals that have been developed to resist corrosion and the two types must contain nickel.

58).- One of these statements is **FALSE** and does not mean the same as **the first sentence of the second paragraph.** Which one? (lines 14-15)

a) Corrosion will be produced provided that two metals touch each other in the presence of moisture.
b) As long as two metals touch each other in the presence of moisture, corrosion will be produced.
c) Corrosion will not be produced if two metals touch each other unless there is moisture.
[✓ d)] Two metals have to touch each other in the presence of moisture. Otherwise, corrosion will be produced.

59).- a) can be defined   c) is called as
[✓ b)] is known as   d) namely
IS THAT

60).- "*results from*" is the opposite of:
[✓ a)] results in   c) is produced by
b) is caused by   d) resulting

61).- If this condition is **PROBABLE** or **REAL**, you have to use:
a) corrode   [✓ c)] will corrode
b) would corrode   d) would have corroded

62).- Only one of these IS NOT A SYNONYM of "*dissimilar*".
a) different   c) not similar
b) unlike   [✓ d)] unlikely

63).- Which of these statements is **TRUE**, according to the last **paragraph?**

a) Engineers can avoid corrosion by using dissimilar metals.
b) The most common method to avoid corrosion is by using stainless steel.
[✓ c)] Engineers have different ways of avoiding corrosion: firstly, by using paint; secondly, by using high-purity metals; third, by using dissimilar metals when they don't have to be in contact in a wet place.
d) One way of fighting corrosion is by using alloys, since they can resist corrosion much better than high-purity metals.

TEST 3

I. Identify the mistake in these sentences.

1) It was not ***until (a)*** 1958 that microelectronics began with the development of ICs (integrated circuits) on silicon chips. This ***led to (b)*** a great increase in the use of electronics in every day items. The introduction of the microprocessor [✓ ***was allow (c)***] electronics ***to be used (d)*** for the control of many common processes.

2) Metal detectors, ***despite (a)*** their technical complexity, [✓ ***is based on (b)***] a few very simple principles. ***The most important (c)*** is ***that of (d)*** electromagnetic induction.

3) A music centre [✓ ***can be classified (a)***] ***either (b)*** a hi-fi (high-fidelity) system or a mid-fi system, ***depending on (c)*** the quality of ***its (d)*** reproduction.

4) ***Since (a)*** not everyone ***is convinced of (b)*** the need for such high quality TV systems, the move towards HDTV ***is likely to be (c)*** very gradual. The first High Definition TV receivers will not need [✓ ***to can to (d)***] process both the old and the new transmissions.

5) Microprocessors are now ***used to (a)*** control many household items. New entertainment devices have been developed, such as video recorders and CD players. In the future, ***electronics (b)*** is likely to become even more common in the home [✓ ***because of (c)***] multimedia entertainment systems and ***computer-controlled robots (d)*** are developed.

6) Those students from EUPVG will make a good ***professional career (a)*** in our company ***as long as (b)*** they have had a good ***University training (c)*** and have got their [✓ ***University title (d)***]. DEGREE

7) I'm ***a third-year student (a)*** of Mechanical Engineering. Next YEAR [✓ ***course (b)***] I will do my final project and after that I'll ***have finished my studies (c)*** and I'll ***get my degree (d)***.

8) A good ***mechanic (a)*** must learn ***mechanics (b)*** and take courses at the University so that he/she can know everything about [✓ ***the mechanical (c)***] of machines and their ***mechanism (d)***.

II. Choose the right alternative. Only ONE is correct.

9) ________________ the ROM memory, the contents of the RAM memory are constantly changing, but they operate while the computer is switched on.
a) Dislike   c) Not like
[✓ b) Unlike]   d) Like

10) The CPU (Central Processing Unit) is the main part of a computer which controls the rest of the system and ***performs*** all the arithmetic and logic operations on the data.
"**performs**" is a synonym of:
a) gives up   [✓ c) carries out]
b) turns on   d) puts up

11) Noise, which is any kind of ______________ signal, can be a problem with amplifiers.
[✓ a) unwanted]   c) unwelcome
b) rejected   d) unacceptable

12) The communication of speech, text and other data by cable and radio is a ___________ field of employment.
a) growth   [✓ c) growing]
b) grew   d) grow

13) "The potential applications for superconductivity in new and existing technology seem ***to have no end***" means:
a) non-ending   c) ending
[✓ b) endless]   d) ended

14) "***To make something long***" is:
a) to long   [✓ c) to lengthen]
b) to length   d) to longen

15) "***Unlikely***" means:
a) dissimilar   [✓ c) improbable]
b) dislike   d) alike

16) Fax machines can send a lot of information in seconds. However, a few seconds' interference on the phone line can make several lines of a document illegible. If the line is noisy, the sending machine will *decrease its speed* to reduce the amount of information lost.
The underlined expression means the same as:
[✓ a) slow down]   c) go down
b) speed up   d) cut off

17) The machine __________________ in spite of a breakdown in an important part of the system.
[✓ a) went on working]   c) went up working
b) kept on work   d) went down work

18) In 1901 Marconi established long-distance telegraph communication and *discovered* how to overcome international distances by reflecting radio waves in the ionosphere.
The underlined verb means the same as:
a) came out c) gave up
[✓ b) found out] d) made up

19) You can take this book home ______________ you give it back to the librarian after the weekend.
Which one cannot be used in that sentence?
a) as long as [✓ c) unless]
b) provided d) only if

20) Vibration sensors will automatically trigger the alarm system ______________ someone tries to break into this building and steal something.
a) in case of c) unless
b) in the event of [✓ d) in case]

21) A telephone network can be used to connect personal computers to an electronic mail system (e-mail). ______________, a different channel of communication has to be used, such as radiolinks, to send and reply to an electronic message.
a) Therefore [✓ c) Otherwise]
b) Unless d) Provided

22) "You will not catch the train in time *if you don't leave now*" means the same as:
[✓ a) unless you leave now] c) in case you leave now
b) provided you don't leave now d) as long as you leave now

23) If that material does not provide enough resistance, then it ______________.
Which one of these is INCORRECT?
a) should be replaced c) has to be replaced
b) will be replaced [✓ d) would have replaced]

24) ______________ so many accidents in the lab this year if the students had kept in mind some safety precautions.
a) They wouldn't have been c) There will not have
[✓ b) There wouldn't have been] d) There wouldn't have

25) We are making progress with superconductivity, but the real ______________ in superconducting technology will be when scientists find a material that superconducts at room temperature.
[✓ a) breakthrough] c) outcome
b) drawback d) breakdown

26) *Memories that only read and that can be programmed and erased* are:
a) erasable programmed read-only memories.
b) erase programme read-only memories.
[✓ c) erasable programmable read-only memories.] ROM
d) erased programmable read-only memories.

INVERTING

27) Configurations of the switcher which invert the voltage are:
- a) voltage-inverting configurations switcher.
- [✓ b) voltage-inverting switcher configurations.]
- c) inverting-voltage switcher configurations.
- d) voltage-inverted switcher configurations.

28) *A system for cooling which is controlled in a mechanic way* is:
- [✓ a) a mechanically-controlled cooling system.]
- b) a mechanic-controlled cooling system.
- c) a mechanically-controlling cooling system.
- d) a controlled-mechanically cooling system.

III. Read the text and answer these questions.

FREQUENCIES.

At very low frequencies (v.l.f.) the waves travel round the earth as if they ***[29]***________ in a waveguide bounded by the earth's surface and the ionosphere. The very low frequency range is mainly used for navigation and military applications. The familiar long (30 kHz-300 kHz) and medium (300 kHz-3 MHz) wave bands ***[30]***________________ the low frequency (l.f.) and medium frequency (m.f.) bands, which are used for radio broadcasting.

Propagation in the short wave or high frequency (h.f.) band of 3 MHz-30 MHz is used for broadcasting, mainly over long distances, for maritime or aeronautical communications and for long distance speech and telex links.

Both very high frequency waves (30 MHz-300MHz) and ultra high frequency waves (300 MHz-3 GHz) propagate over relatively short distances ***[31] ranging from*** a few tens of kilometres to one or two hundred kilometres. The very high frequency band is used for high quality frequency modulated radio broadcasts ***[32]***___________ the relatively large bandwidth available is traded for ***[33] an improved signal-to-noise ratio***. A radio frequency bandwidth of about 200 kHz is used for an audio signal bandwidth of 15 kHz. Both the very high frequency and ultra high frequency are used for television broadcasts.

The term microwaves is often applied to radio frequencies above 1 GHz (the upper limit is not usually defined precisely and merges into the infrared region of the electromagnetic spectrum). ***[34]***_______________, the microwave region includes some of the ultra high frequency band. It also includes the super high frequency band (s.h.f) of 3-30 GHz, and the extremely high frequency band (e.h.f.) of 30-300 GHz, sometimes ***[35] referred to as*** millimetre wave band.

Space wave propagation of narrow microwave beams is used for point-to-point communication over broad bands. An important application is the use of microwave links in telephone and telegraph systems.

Microwave telephone links normally use f.d.m. CCIR recommendations exist for systems at 2 and 4 GHz with up to 1800 telephone channels, and at 6 GHz with up to 2700 channels. A capacity of 1800 telephone channels is adequate for one colour television channel. One ***[36] increasingly*** important use of narrow beam microwave transmission is with satellites which can operate as repeaters for long distance telephone, television and data links.

(From: Telecommunications, Developing Reading Skills in English by David Davies, pp. 15-16)

29.- a) will be b) would be [✓ c) were] d) was

30.- [✓ a) are known as] b) are divided into c) MAY can be defined AS d) are called ~~as~~

31.- "***ranging from***" (line 10) can be substituted by:
[✓ a) which ranges from] c) that ranged from
b) which range from d) who are ranged from

32.- a) whose b) which c) that [✓ d) where]

33.- "***an improved signal-to-noise ratio***" (line 14) means:
[✓ a) that the proportion between noise and signal is much better.]
b) that there is a correspondence between signal and noise.
c) that the percentage between noise and signal is poorer.
d) that the correlation between noise and signal has to be improved.

34.- [✓ a) Therefore] b) Since c) As a result of d) As

35.- "***referred to as***" (line 21) IS NOT A SYNONYM of one of these:
a) termed c) called
b) named [✓ d) described as]

36.- "***increasingly***" (line 29) can be substituted by:
a) advancing [✓ c) progressively]
b) developing d) intensively

ACCORDING TO THE TEXT,
WHICH FREQUENCIES ARE USED FOR THE FOLLOWING?

37.- **TELEX**
a) v.h.f. [✓ b) h.f.] c) v.l.f. d) l.f. and m.f.

38.- **TELEVISION**
[✓ a) u.h.f., v.h.f. and microwave] c) l.f. and m.f.
b) u.h.f. and v.h.f. d) v.h.f., u.h.f. and e.h.f.

39.- **F.M. RADIO**
a) u.h.f. and v.h.f c) u.h.f., v.h.f. and microwave
[✓ b) v.h.f] d) l.f. and m.f.

40.- **DATA LINKS**
a) s.h.f. and e.h.f. c) v.h.f., s.h.f. and e.h.f.
b) l.f. and m.f. [✓ d) microwave]

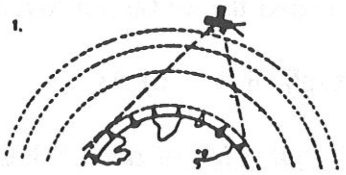
MATCH THESE SENTENCES WITH THE CORRESPONDING FIGURE:

41.- S.h.f. and u.h.f. signals are not reflected by the ionosphere, but pass through it into space.
a) 1 [✓ b) 2] c) 3 d) 4

42.- Microwaves can be transmitted around the earth by means of line-of-sight relay or by satellite.
[✓ a) 1] b) 2 c) 3 d) 4

43.- L.f. wavelengths travel around the curvature of the earth using the surface and the ionosphere as a waveguide.
a) 1 b) 2 [✓ c) 3] d) 4

1.



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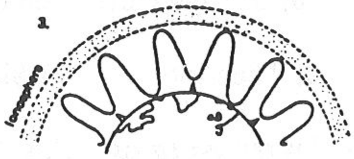
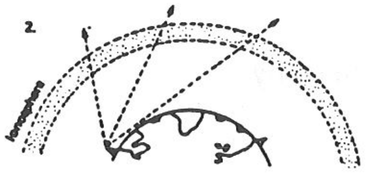


2.



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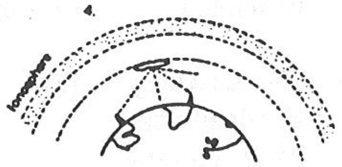


IV. Choose the right option for these sentences:

44) In the sentence: *The insulators shall be placed between the plates.* ***SHALL*** indicates:
- a) expectation
- [✓ b) that the instructions must be followed *exactly*]
- c) strong obligation
- d) advice

45) Choose the verb which indicates the same as the underlined words in the sentence *The fault is possibly due to a short circuit.*
- [✓ a) could be due to]
- b) must be due to
- c) ought to be due to
- d) might ~~to~~ be due to

46) The cylinder head ________ removed when it is hot.
- a) should
- b) must ~~to~~ be
- c) may have been
- [✓ d) must be]

47) A diesel car is a car ________ engine is diesel.
a) which b) who [✓ c) whose] d) in which

48) Is that the scientist ________________?
[✓ a) you were talking to] c) whom you were talking with
b) who you were talking d) to who you were talking

49) *Some of the problems* ***caused by*** *pollution can be eliminated.* ***Caused by*** can be substituted, without changing the meaning, by:
a) which are causing c) which cause
[✓ b) which are caused by] d) by which is caused

50) Which one is ***NOT CORRECT***?
a) The experiment he carried out was a success
b) The experiment that he carried out was a success
c) The experiment which he carried out was a success
[✓ d) The experiment who he carried out was a success]

51) The scientists ***who proved*** the effects of air pressure were Torricelli and Pascal. *Who proved* can be substituted by:
a) which proved c) proved
b) who proving [✓ d) proving]

52) ***Therefore*** is ***NOT A SYNONYM*** of one of the following:
a) Consequently b) Thus c) Hence [✓ d) As a result of]

53) The bars in jails are used to ______________.
a) avoid prisoners from escaping.
[✓ b) prevent prisoners from escaping]
c) avoid prisoners escaping
d) prevent prisoners escaping

54) The engineer checked all the components ____________ find the fault.
[✓ a) so as to] b) for c) so that d) in order

55) A magnifying glass is a device which ____________ magnifying objects.
a) serves to c) is responsible to
[✓ b) is used for] d) is used in order to

56) A computer system is __________ hardware, software, personnel and communications.
a) composed into [✓ c) made up of]
b) comprised of d) divide into

57) A resistor ____________ amplifying electric signals.
a) serves to [✓ c) performs the function of]
b) operates for d) enables

58) These books are classified ____________ their author.
a) as b) into c) respect to [✓ d) according to]

59) The classification of elements is done ____________ their atomic number.
Which one is ***FALSE***?
[✓ a) in order to]
b) according to
c) with respect to
d) on the basis of

60) This device is ___________ many different components.
a) composed up of
b) divided by
c) comprised by
[✓ d) made up of]

61) Arabic is written in the opposite direction to English, ***that is***, it is written from right to left. ***That is*** means the same as:
a) for example
[✓ b) namely]
c) so that
d) for instance

62) Pollution ___________ changes in the atmosphere. Which one is ***FALSE***?
a) produces
b) results in
[✓ c) results from]
d) brings about

63) The greenhouse effect ***is the result of*** pollution. **Which one does not mean** *THE SAME?*
a) is produced by
b) is caused by
[✓ c) leads to]
d) results from

64) ____________ the change in the weather, hundreds of living creatures could become extint.
[✓ a) Because of]
b) Because
c) As a result
d) As

65) ____________ the system did not work was because there was a failure in one of the components.
a) As a result of
b) Due to
c) The reason for
[✓ d) The reason why]

66) They choose copper for the experiment ____________ it is a good coductor.
[✓ a) since]
b) thus
c) so
d) therefore

67) They mechanised the factory. ______________ some workers were sacked. Which one is ***FALSE***?
a) As a consequence
b) Hence
[✓ c) So]
d) Consequently

68) This valve allows ____to____.
a) fuel ~~from~~ flowing ([illegible])
[✓ b) fuel to flow]
c) flow fuel
d) fuel to ~~flowing~~

V. Now read this text carefully and answer the questions.

COMPUTERS AND EPIDEMIOLOGY: THE MICHELANGELO EFFECT.

A computer virus is a program or piece of a program that, when executed, "infects" another part of a computing system by making a copy of itself. Most PC-DOS viruses infect boot records of disks or executable programs. Computer viruses have been a major problem for their hosts for more than six years. Massive outbreaks have been rare, they only appear from time to time. But since society is beginning to rely more and more on computers, contagious programs are also beginning to seem as frightening as biological diseases.

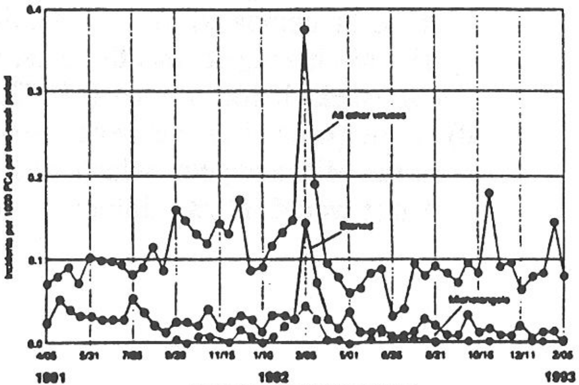
How bad is the problem today? How bad might it become? How might company managers help ensure safe computing environments? For answers to these questions, the behaviour of computer viruses must be understood at two levels: microscopic and macroscopic. The micro level is the focus of hundreds of researchers who dissect and try to kill off the dozens of new viruses written every month. In contrast, the macro view of computer viruses has been delayed. The lack of information about their frequency was evident during the hullabaloo over the Michelangelo virus two years ago, during which the effects of its disruption were overestimated.

A computer virus has never stirred up so much public hysteria as during the two-week period ending on March 6 1992. Front-page newspaper stories and evening news on TV reported that a terrible virus was ready to disrupt computers on the March 6 birthday of Michelangelo. The public was persuaded that this might be the big one --the electronic equivalent of the bubonic plague-- with millions of machines infected.

In fact, the number of machines infected by the Michelangelo virus was less than a widely quoted estimate of five million, and the damage it caused was slight. But, as shown in the graph below, all the publicity had an interesting effect on all computer viruses, including Stoned, the one most common at the time.

The rate at which incidents in the population sampled by IBM were reported peaked anomalously during this period, not because they actually came out all of a sudden, but because many viruses that had been infecting machines for some time were finally detected. Many users (both inside and outside the same population of hundreds of thousands of PCs) decided to scan their systems just because of the Michelangelo virus. In some cases, companies spent large amounts of time and money doing so. The scanners found any kind of recognizable virus in the system, such as Stoned. Due to this much heightened vigilance during the four-week period before March 6, eleven new viruses in the sample PC population were detected which was a high record.

The hysteria had two effects on computer viruses. First, because many users scanned their machines during the same period, the reservoir of viruses was drastically reduced both inside and outside the sample population, and many fewer virus incidents were reported in the succeeding weeks. Second, the increased installation of anti-virus software appears to have lowered the equilibrium level of many of the most common viruses, leaving it at about half of their previous frequence of occurrence. Still, despite some beneficial side effects, this kind of hysteria is better if it can be avoided.



(From: IEEE SPECTRUM MAY 1993, pp. 20-21)

69.- Which is ***FALSE*** according to the **first paragraph**?

a) Computers viruses can alter or destroy information contained in disks or programs when executed by making a copy of themselves and affecting other parts of a computing system.
b) Computer viruses are as terrible as biological diseases, since they can copy themselves and then spread into other parts of a computing system destroying all kinds of information.
[✓ c)] Massive outbreaks of computer viruses started to appear repeatedly six years ago and since then they have become a major problem for their hosts. Now they are considered to be as dangerous as some biological diseases.
d) The dependence of society on computers is so important that, even though these viruses affect computers from time to time, they have become as frightening and dangerous for our society as biological diseases.

70.- Which is ***FALSE*** according to the **second paragraph**?

a) The way to deal with the problem of computer viruses and to make computing environments safe is to understand their behaviour from the microscopic and the macroscopic point of view.
b) Apart from the hundreds of researchers who are trying to detect and destroy all the new viruses that appear, the real problem with the behaviour of computer viruses is that it will be very difficult to have completely safe computing environments unless we have more information about their frequency.
c) The hullabaloo over the Michelangelo virus two years ago showed that the hundreds of researchers, who try to detect and destroy all new viruses, estimated too highly the effects of this virus. Thus, evidencing the lack of information about these viruses.
[✓ d)] The disruption of the Michelangelo virus two years ago was delayed due to the fact that hundreds of researchers, who try to detect and destroy all new viruses written every month, estimated its frequency of appearance.

71.- Which is ***FALSE*** according to the **third paragraph**?

[✓ a)] The Michelangelo virus gave rise to public hysteria during the two weeks in which it disrupted computers and infected millions of machines.
b) All the information the press and TV gave about the Michelangelo virus brought about public hysteria and made people believe that the effects of this electronic virus could be compared to the bubonic plague.
c) The Michelangelo was the most widely reported virus on newspapers and TV for two weeks before March 6 1992.
d) A computer virus has never been given so much attention on newspapers and TV as the Michelangelo, which was reported everywhere in the media to warn people that it would infect millions of machines.

72.- Which is ***TRUE*** according to the **fourth paragraph**?

a) The damage the Michelangelo virus produced was widely over five million machines infected.

[✓ b)] The damage the Michelangelo virus caused was less important than it had previously been estimated, although there were slightly below five million machines infected.

c) The Michelangelo and the Stoned together, the most common viruses at the time, infected less than 1/5 million machines.

d) The Michelangelo virus caused little damage but infected more machines than they had previously estimated in the graph.

73.- According to the **fifth paragraph**?
What is the real consequence of all the publicity given to the Michelangelo virus on all the other computer viruses?

a) IBM decided to sample the population of hundreds of thousands of PCs and detected all the viruses that came out at the time.

b) Many users decided to scan the systems of their PCs and many companies decided also to spend a lot of time and money in scanning their systems to find any kind of recognizable virus.

c) During this period there were more incidents with viruses.

[✓ d)] Eleven new viruses that had been infecting machines for some time were finally detected in the population sampled by IBM because of all the vigilance.

74.- Which of these is ***FALSE*** according to the **sixth paragraph**?

a) As a result of the scanning of the machines, the number of viruses and of incidents decreased outside and inside the sample population.

b) More anti-virus software has been installed, therefore, reducing both the number of many of the most common viruses and up to 50% of their previous frequence of occurrence.

[✓ c)] All these positive effects meant that in succeeding weeks there was an increase in the installation of anti-virus software which decreased the level of viruses.

d) Even though all these side effects have contributed to prevent the number of viruses and incidents in PCs, it is much better to avoid this kind of hysteria.

75.- What is the **main idea** in the text?

a) If there had not been such a public hysteria about the effects of the Michelangelo virus, it would have never been possible to increase the installation of anti-virus software in many PCs.

[✓ b)] All the publicity about the Michelangelo virus led to a higher degree of vigilance in PC systems which caused many other viruses that had been infecting machines to be detected.

c) Owing to the Michelangelo effect, many users and companies decided to scan their systems.

d) The disruption of the Michelangelo virus was not as terrible as everybody had predicted.

VI. Read the text and answer these questions.

The fantastic market rise in electronics in recent decades reflects a circuit building revolution. Expectations of function are ever increasing, demanding more complex, more reliable, more compact and cheaper circuits than were possible in the early days of electronics.

In the earliest circuits, large components (valve holders, capacitors, etc.) (76)__________ into a chassis and connected by a nest of (77) ***colour-coded wires***. Putting this lot together required a small army of solderers. The invention of transistors around 1950 announced the revolution. The size of active devices was cut a thousandfold, and (78) **they** needed only one-tenth of the voltage to run them, (79) **allowing** much smaller capacitors to be used. And in circuits with no functional need for power (such as signal amplifiers), introducing transistors reduced the power by a factor of a hundred; so resistors became smaller. All this miniaturization was well served by a new form of circuit construction (80) ***in which*** the wires were replaced by a pattern of conductors fixed onto one side of the substrate (This new word emphasises that the board (81)__________ both the insulation between conductors and for their mechanical support). The wire terminations of the devices poked through holes from the blank side of the board and were soldered to the conducting regions on the other side. This sort of cicuit assembly (82)_________ a printed circuit board (PCB). The formation of the pattern of conductors was to some extent a mechanised process, but at this stage each device still had to be placed and soldered by hand.

To reach today's level of of circuit complexity, the problems of productivity and reliability had to be solved. To make circuits of present-day complexity, production lines of people making solder joints one at a time would be prohibitively slow and expensive, and the consequences of malfunctional joints rather nasty. Suppose as few as one in ten thousand joints is no good. If systems containing a thousand joints are in production, then, on average, only 10% will not work and the fault may be easily found. But if each job (83) _________ ten thousand connections there would be a poor chance that any would work and the fault finding would be more difficult.

(84) ________ there are more companies designing and building customized printed circuit boards than are engaged in any other activity in the electronics industry. Although the substrate is still (85) ***a polymeric insulating board***, the conducting tracks still copper, and soldering the main method of fixing devices, PCBs have come a long way since the 1950's. Most PCB's are now assembled by robot placement and soldered in a single pass through a soldering machine. The benefits of speed, accuracy, reliability and reduced labour more than compensate for the capital investment needed to (86) ***set up*** production facilities.

76) a) had been built
[✓ b) were built]
c) are built
d) was built

77) What is a ***colour-coded wire***? (line 6)
a) a wire which codes colours
b) a coloured wire used for coding
[✓ c) a wire which is coded by using colours]
d) a coloured wire code

78) ***They*** on line 9 refers to:
a) transistors
[✓ b) devices]
c) solderers
d) wires

79) ***Allowing*** on line 9 can be substituted by:
a) preventing
b) causing
[✓ c) enabling]
d) keeping

80) ***In which*** on line 13 could be substituted by:
a) which
b) that
[✓ c) where]
d) in that

81) [✓ a) is responsible for]
b) serves to
c) performs the function of
d) is used

82) a) ~~can~~ MAY be defined AS
[✓ b) is known as]
c) is called ~~as~~
d) namely = THAT IS

83) a) would contain
b) will contain
c) had contained
[✓ d) contained]

84) [✓ a) Nowadays]
b) Actually
c) in the early days
d) Really

85) Which one is ***FALSE***? A ***polymeric insulating board*** is:
[✓ a) a polymeric board which is insulated] → INSULATED — POLYMERIC
b) a polymeric board which is used for insulating A
c) a polymeric board which insulates
d) an insulating board made of polymer

86) ***set up*** on line 37 means the same as:
a) invent
b) enlarge
[✓ c) establish] = INSTAL
d) erect

87) Which title would you choose for this text?
a) Today's production of PCB's
b) The earliest circuits
[✓ c) The evolution in the production of PCB's]
d) The invention of transistors

88) According to the **second paragraph**, which of these statements is ***TRUE***?

a) The earliest circuits were soldered by the army.
x b) After the invention of transistors around 1950, the circuit assembly changed.
c) The production of PCBs was a completely mechanised process.
d) After the invention of transistors, circuits were reduced and conductors were replaced by wires.

89) One of these statements is ***FALSE*** and does not mean the same as the lines 25-27 of the **third paragraph**. Which one?

Suppose as few as one in ten thousand joints is no good. If systems containing a thousand joints are in production, 10% will not work.

a) Provided that systems containing a thousand joints are in production, 10% will not work. ΔΕΙΡΜ
b) As long as systems containing a thousand joints are in production, 10% will not work.
x c) Unless systems containing a thousand joints are in production, 10% will not work.
d) On condition that systems containing a thousand joints are in production, 10% will not work.

90) According to the **last paragraph**. Which has been the main change in the production of PCBs?

a) Today designing and printing PCBs is the main activity in the electronics industry.
b) The substrate, the conducting tracks and the way of fixing devices have changed.
x c) Now the assembly process is almost completely mechanised.
d) The earliest circuits were more accurate and reliable.

TEST 4

I. Choose the right option. Only ONE is correct.

1) A device which has been tested several times ______________ to work properly.
   [✓ a) is expected] To c) can
   b) is recommended d) should

2) Thousands of telephone channels ______________ be carried by optical fibre conductors.
   [✓ a) can] c) should
   b) must d) shall

3) Excessive heat ______________ damage electronic components.
   Which one is ***WRONG***?
   a) may c) could
   b) might [✓ d) must]

4) Have you finished reading the report ______________ I gave you?
   Which one is ***WRONG***?
   a) which [✓ c) Ø]
   b) that [✓ d) whom]

5) That international company is a good place ______________.
   Which one is ***WRONG***?
   a) where you can get a good job.
   [✓ b) which you can get a good job.]
   c) in which you can get a good job.
   d) which you can get a good job in.

6) That is the scientist ______________ we were talking.
   a) about who [✓ c) about whom]
   b) who d) whom about

7) That is the computer ______________ monitor doesn't work properly.
   [✓ a) whose] cuyo c) of which
   b) which d) in which ≠ WHEN

8) The device ***which supplies*** energy to the building is an innovating model.
"***Which supplies***" can be shortened as:
a) supplied
b) supply
[✓ c) supplying]
d) to supply

9) Some of the machines ***which were produced*** in that factory were faulty.
Which were produced can be shortened as:
a) producing
[✓ b) produced]
c) to produce
d) produce

10) A rectifier ____________ a device which allows an electric current to pass in one direction but not in the oposite direction.
a) is known as
[✓ b) is defined as]
c) is called
d) may be defined AS

11) They checked the apparatus ______________ find the fault. Which one is ***WRONG***?
a) so as to
[✓ b) for to]
c) in order to
d) to

12) All these security devices are used to ______________.
a) avoid gas from escaping. → TO AVOID + V. ING
b) avoid gas escaping.
[✓ c) prevent gas from escaping.]
d) prevent gas escaping.

13) A rotor, a stator and a brushgear _____________ an electric motor.
Which one is ***WRONG***?
a) make up
b) constitute
c) form
[✓ d) comprise]

14) A micrometer cylinder gauge _____________ measuring internal diameters.
a) serves to
[✓ b) is responsible for]
c) performs the function OF
d) enables

15) The hot tap _____________ the hot water flow.
[✓ a) controls]
b) are responsible for
c) serves to
d) performs the function of

16) Overrapid cooling can result in faults, ___________ cracking and distortion.
One of these ***CANNOT BE USED*** in this sentence:
a) for example
b) for instance
[✓ c) that is]
d) e.g.

17) Dielectric materials are classified _____________ their dielectric constant.
Which one is ***WRONG***?
a) according to
b) with respect to
c) on the basis of
[✓ d) into]

18) All the accidents in the lab last year ______________ carelessness.
a) resulted ~~in~~
[✓ c) resulted from]
b) gave rise to
d) were caused

19) Refractory metals are called refractory ______________ their high melting point.
[✓ a) because of]
c) since
b) because
d) on account OF

20) ____________ the wide range of mechanical, physical and chemical properties, ferrous alloys are among the most useful of all metals.
Which one is ***WRONG***?
a) due to
c) as a result of
b) owing to
[✓ d) because]

21) As a result of ABSUN/GEEVND______________, the refrigerant condenses.
Which one is ***WRONG***?
a) increased pressure
c) increasing pressure
b) pressure being increased
[✓ d) increase pressure]

22) The measuring instruments were defective. ___________ __, the experiment was a failure.
Which one is ***WRONG***?
a) Therefore
b) Hence
c) Consequently
[✓ d) As]

23) The insulation of a wire ___________ people from receiving an electric shock.
Which one is ***WRONG***?
a) keeps
[✓ c) causes]
b) prevents
d) stops

24) If the engine ______________, this would probably mean the mixture is too weak.
a) overheats
c) had overheated
[✓ b) overheated]
d) has overheated

IF + PAST + COND.

25) If the lamp had ended black, this ___________ due to a faulty lamp or starter.
[✓ a) would have been]
b) had been
c) must be
d) would be

IF + PAST PERFECT + COND. PERFECT

26) You can use my car ______________ you fill in the tank when you come back.
[✓ a) provided]
b) on condition THAT
c) as LONG AS
d) so long AS

27) Break the glass ______________ fire.
a) in case OF
[✓ b) in the event of]
c) in THE event of
d) in ~~the~~ case of

28) He studied hard for the exam, ______________ he wouldn't have passed it.
a) unless
b) therefore
c) if
[✓ d) otherwise]

29) The refrigerant in ______________ is freon.
a) home air-conditioning systems
[✓ b) air-conditioning home systems]
c) home air-condition systems
d) home conditioned-air systems

30) A building which is intelligent and costs a small amount of money is:
a) a cost-low intelligent building
[✓ b) a low -cost intelligent building]
c) a low cost building intelligent
d) a cost low intelligent building

31) The speed at which a measurement is recorded is said to be:
a) the recording measurement speed
b) the speed measurement-recording
c) the measurement speed-recording
[✓ d) the measurement-recording speed]

32) The discovery of penicillin was a very important ______________ to humankind.
[✓ a) breakthrough] c) breakdown
b) outbreak d) output

33) A heated body ___________ energy in the form of electromagnetic waves.
a) gives up [✓ c) gives off]
b) gives away d) gives by

34) The experiment was _____________ by some young scientists in 1986. It was very successful.
[✓ a) carried out] c) carried on
b) carried away d) carried about

35) Conditions which are not variable are:
a) non-variable conditions c) invariable conditions
[✓ b) unvariable conditions] d) imvariable conditions

36) The opposite of **useful** is:
a) unuseful b) useness c) non-useful [✓ d) useless]

37) When you finish your studies you will get your university ______________.
a) title [✓ b) degree] c) grade d) license
NOBEL SIR - CONDE GRADO ACADEMICO ALCOHOL --

38) The new translating machine is _____________ in the world.
a) only b) sole c) best [✓ d) unique]
UNICO EN EL MUNDO.

39) If you have had a good university ____________, it won't be difficult for you to get a job.
a) preparation [✓ b) training] c) studies d) formation
PREPARATION PREPARACIÓN ACADÉMICA. PREPARACIÓN

II. Read the text carefully and choose the right option.

DIGITAL COMPUTERS AND THEIR USES.

In the digital computer the numbers to be manipulated are represented by sequences of digits which are first recorded in a suitable code --usually the binary code--, and then converted into positive and negative electrical impulses, and stored in electrical or magnetic registers ***[40]***__________ *are used basically for the same purpose as the counting wheels in a desk calculating machine.*

The technique of making the computer carry out a particular calculation ***[41]***__________ *"programming", which involves first* ***[42] breaking*** *the calculation* ***down*** *into a sequence of arithmetic operations, and then preparing a series of instructions which* ***[43]***____________________ *the required operation on the stores information in the correct order. It is now possible to add or subtract two large numbers in one to two microseconds, and to multiply or divide them in ten to twenty microseconds, thus* ***[44] enabling*** *a computer to perform as much arithmetic in a quarter of an hour as an efficienT clerk with pencil and paper* ***[45]***___________ *hope to achieve in a lifetime.*

There are many situations ***[46]***____________ *this ability to handle and analyze large quantities of arithmetic data* ***[47]***_______________ *instructions is of great value. Some examples are fields of scientific investigation such as crystallography, atomic physics and astronomy where masses of experimental data are involved and complex theoretical concepts need to be tested against them; in engineering design where the design parameters, of which there are many, can be varied systematically and* ***[48] their*** *effects studied and optimized;* ***[49]*** *and for the storage of reference data in libraries and insurance offices in such a way as to afford ready access to particular references on request.*

A particularly important application of the digital computer in simplified form is a component in the ***[50]***____, *as the nerve centre which accumulates and analyses data in recording the operating conditions and performances of the plant, and sends out instructions, when appropriate, for their application. This is one aspect of what is referred to as "automation" --the replacement of human control by instrumental control. The completely automatic factory is no longer a fantasy. What is restraining its relization are the difficulties in handling the severe economic considerations and the complex human problems involved.*

40.- a) who [✓ b) which] c) where d) whose

41.- a) is known AS
b) is classified
[✓ *c) is known as*]
d) may be defined AS

42.- ***"breaking*** *the calculation* ***down"*** *on line 7 means in this context:*
a) to finish the calculation [✓ *c) to divide the calculation*]
b) to damage the calculation *d) to reconstruct the calculation*

43.- *a) cause that the computer carry out*
b) cause to carry out the computer
c) cause the computer from carrying out
[✓ *d) cause the computer to carry out*]

44.- ***"enabling"*** *on line 11 means:*
[✓ *a) allowing*] *c) preventing*
b) forcing *d) making*

45.- *a) should* [✓ *c) might*]
b) is certain to *d) ought to*

46.- *a) whose* *b) which* *c) that* [✓ *d) in which*] = WHERE.

47.- [✓ *a) according to*]
b) with respect ~~for~~ TO
c) based
d) on the basis of

48.- ***"their"*** *on line 19 refers to:*
a) experimental data
b) theoretical concepts
[✓ *c) design parameters*]
d) fields of investigation

49.- *Only one of these statements is* ***FALSE*** *according to the 3rd* ***paragraph:***

a) Digital computers facilitate the direct access to particular references on request in libraries and offices.

b) With digital computers the obtention of particular references on request in libraries and offices is quicker and more direct.

c) Digital computers make it possible to get particular references on request in libraries and offices.

[✓ *d) The access to particular references on request in libraries and insurance offices is much easier than anywhere else.*]

50.- ***"The processes for manufacturing the control of equipment"*** *are:*
a) control equipment manufactured processes
b) equipment control manufacture processes
c) equipment-manufacturing control processes
[✓ ***d) equipment control manufacturing process***]

III. Read the text carefully and choose the right option.

ELECTRIC PROTECTION DEVICES.

I. [51] This term refers to a particular type of equipment applied to electric power systems to detect abnormal conditions and to initiate appropriate action to correct the abnormal condition. From time to time, disturbances in the normal operation of electric power systems occur. **[52] These may [53] be caused by** natural phenomena, such as lightning, wind or snow; by accidental means **[54] due to** careless drivers, inadvertent acts by plant maintenance personnel, or other acts of human beings; or by conditions produced in the system itself, such as switching surges, load swings, or equipment failure.

II. [55]_______________protective devices must be installed on a power system are to ensure continuity of electric service, to prevent injury to personnel, and to limit damage to equipment when abnormal situations occur. The application of these devices can vary very widely since [56] **they** are applied in proportion to the degree of protection required.

III. Zone Protection. **[57] In order to** apply protection, power systems **[58] are divided into areas or zones.** Each component of a power system corresponds to one of the five different zone classifications: generator, transformer, bus, transmission line, or motor. [59]____________, protection devices are applied to each zone to detect abnormal system conditions in that zone and to start actions for the removal of that zone from the rest of the system. [60] Figure 1 illustrates the principle of zone protection on a simple power system. As you can see, complete protection is guaranteed since all these zones overlap. The removal of only the malfunctioning part of the system ensures maximum electric service continuity.

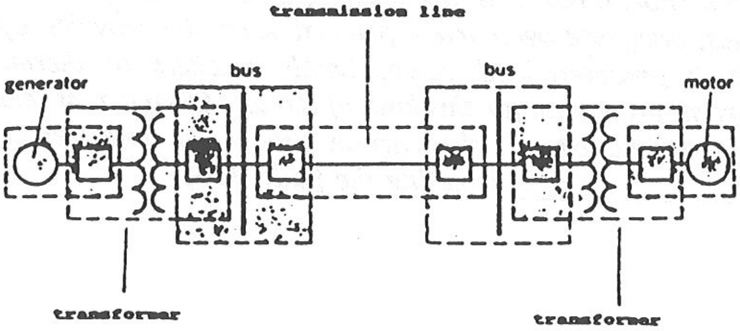


Fig. 1. Zones of protection on simple power system.

IV. Protective Relays. These are used to detect changes in the voltages and currents on a power system. Large variations in the voltages and currents on the system can cause the relay to operate. The operation of the relay **[61] results in** the opening of the circuit breakers to isolate that portion of the power system [62]_______________an abnormal voltage or current condition. A fault in one part of the system affects all the other parts of the system. Thus, the relays in the power system must be coordinated to ensure the best quality of service to the loads, and to isolate the equipment near the fault in order to prevent excessive damage or personal hazard. [63]

V. Electromechanical relays are built to respond to voltage, current, or a combination of both. The operation of the relay can open or close a contact. Two basic principles are used in the making of electromechanical relays. The simplest type of relay operates on the electromagnetic attraction principle. This relay is composed [64]__________ a coil, a plunger, and a set of contacts, as it is shown in Figure 2. When current (I) flows in the coil, a force is produced that causes the plunger to move and close the relay contacts. These relays are characterized by their fast time of operation. [65] The electromagnetic induction principle is also used as a basic building block in the construction of induction relays. This type of relay responds to alternating current only, whereas the relays discussed above respond to either direct or alternating current. Briefly, an induction relay consists of an electromagnetic circuit, a disk or other form of rotor made of non-magnetic current-carrying material, and contacts. By use of the principles of electromagnetic attraction and electromagnetic induction, protecting relays can be built to respond to all abnormal conditions that may occur in practice.

[66]

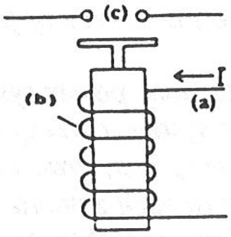


Fig. 2. Plunger relay.

VI. Overcurrent Protection. This must be provided on all systems [67] to prevent ***abnormally high currents from overheating*** *and causing mechanical stress on equipment. Overcurrent in a power system usually indicates that current is being diverted from its normal path by a short circuit. In low-voltage, distribution-type circuits,* ***[68] such as*** *those found in homes, adequate overcurrent protection can be provided by fuses that melt when current exceeds a predetermined value. Small breakers of thermal-type circuits also provide overcurrent protection for this kind of circuit. Overcurrent relays are applied to measure the current continuously. If the current reaches a predetermined value, the relay contacts [69]______________, isolating the fault. [70]*

51.- What are the three main causes of disturbances in electric power systems?
(1st paragraph).

a) lightning, wind and snow.
b) natural phenomena, maintenance personnel and other acts of human beings.
[✓ *c) natural phenomena, accidental acts of human beings and the conditions produced in the system itself.*]
d) equipment failure, natural phenomena and conditions produced in the system itself.

52.- ***"These"*** *on line 4 refers to:*

a) electric power systems
[✓ *b) disturbances*]
c) abnormal condition
d) natural phenomena

53.- Give a synonym of ***"be caused by"*** *on line 4:*
[✓ a) result from] *c) be brought about by*
b) produce *d) lead to*

54.- ***"due to"*** *on line 5 could be substituted by:*
a) as a result *c) since*
b) as *[✓ d) because of]*

55.- a) The reasons for
[✓ b) The reasons why]
c) Owing to
d) This is because of

56.- ***"they"*** *on line 11 refers to:*
a) application *[✓ c) protective devices]*
b) abnormal conditions *d) electric devices*

57.- Give a synonym of ***"In order to"*** *on line 12:*
[✓ a) So as to] *c) According to*
b) The function of *d) For*

58.- ***"are divided into"*** *on lines 12-13 means the same as:*
a) enable *c) belong to*
b) are regulated by *[✓ d) are made up of]*

59.- a) So *c) Since*
[✓ b) Therefore,] *d) As a result of*

60.- What is the purpose of overlapping zones in zone protection?
(3rd paragraph)
a) to guarantee partial protection.
b) to guarantee complete protection for the user.
[✓ c) to make it possible to remove the malfunctioning part without stopping the electric service of the whole power system.]
d) to detect abnormal conditions in the system.

61.- ***"results in"*** *on line 22 has a synonym in:*
a) comprises *c) results from*
[✓ b) leads to] *d) serves to*

62.- [✓ a) experiencing] *c) experienced*
b) who is experiencing *d) which is experienced*

63.- When do protective relays operate? ***(4th paragraph).***
[✓ a) When there is a considerable large variation from normal in the voltages and currents of a power system.]
b) When there is a fault in the power system.
c) When the circuit breakers open.
d) When a fault in one part of the system affects all the other parts of the system.

64.- a) by b) for c) into [✓ d) of]

65.- Which of these statements is TRUE according to the text, and can complete the sentence given below? (5th paragraph).

"There are two basic principles used in electromagnetic relays: attraction and induction. However,..............."

a) the attraction relay can respond only to direct current and the induction relay can respond only to alternating current.

b) both types of relays can respond to direct and alternating current.

c) the attraction relay responds only to alternating current, whereas the induction relay responds to both direct and alternating current.

[✓ d) the attraction relay responds to both direct and alternating current, whereas the induction relay responds only to alternating current.]

*66.- According to the description given in the **5th paragraph**, can you choose the right term for the missing words indicated by* a) b) *and* c) *in **Figure 2**?*

[✓ *a)* [a] coil [b] relay contact [c] plungers]
b) [a] plunger [b] coil [c] relay contacts
c) [a] relay contact [b] plunger [c] coils
d) [a] building block [b] coil [c] relay contacts

*67.- **"to prevent abnormally high current from overheating and..."** on lines 42-43 could be substituted by:*
a) to avoid abnormally high currents from overheating...
b) to allow abnormmally high currents to overheat...
[✓ c) to keep abnormally high currents from overheating...]
d) to avoid overheating abnormally high currents...

*68.- **"such as"** on line 45 means the same as:*
[✓ a) like] *c) with respect to*
b) namely *d) example*

69.- a) would close *c) would have closed*
[✓ b) will close] *d) closes*

*70.- Choose the **FALSE answer** for this question: What effect can overcurrent have on equipment? **(6th paragraph).***
[✓ a) It may prevent overheating and mechanical stress.]
b) It can cause overheating and mechanical stress.
c) It can cause a short circuit.
d) It can cause a fuse to melt.

TEST 5

I.- Identify the mistake in these sentences.

1) If two crystals of a semiconductor material, one of the p-type and one of the n-type ***(a) are joined together***, a pn junction ***(b) will be formed***. This junction ***(c)can be used as*** a rectifier and is known as ***(d) a diode junction pn***.

2) A number of instruments ***(a) can be used to*** measure voltage. The moving-coil meter is often used ***(b) because*** its low cost and versatility. However, if the impedance of the instrument ***(c) were*** low, the meter ***(d) would draw*** too much current from the circuit.

3) When a forward voltage is applied across the diode, there is, at first, only ***(a) a slow rise*** in current. The diode ***(b) allows current flowing*** freely. But if a reverse voltage ***(c) is applied to*** the diode, it conducts ***(d) badly.*** ^allows _ to

4) ***(a) Even*** our sophisticated modern system has a limiting factor: the digitized flow of electrons over metal wires has a certain ***(b) message-carrying capacity***, and this restricts ***(c)the thickness*** and the speed ***(d) with that*** the messages can be sent.

5) Low orbit satellites (L.O.S.) --***(a) which*** height varies from 150 to 400 kilometres-- are of little use ***(b) for*** telecommunication ***(c)as*** they are only in line of sight of each other ***(d) for about*** 15 minutes.

6) The best way to understand ***(a) how*** a fiber optics communication network operates is to view it as a natural extension of ***(b) the actual telephone system***. In the early telephone systems, a sensitive membrane in the headset translated the pressure changes that ***(c)were caused by*** the human voice into ***(d) a series of alternations*** in an electric current.

7) I'm a third-year student of ***(a) Chemical Engineering***. Next year I'll only ***(b)have my final project left to do***. And when ***(c) I get my degree*** I hope to find a good job with ***(d) my University career.***

← degree

8) The costs of production ***(a) resulted to be*** much higher than predicted previously. ***(b) Therefore***, we had to reduce ***(c)our outlay***. The problem was that our estimates were ***(d) overcalculated.***

II. Choose the right option. Only one is correct.

9) One of the main processes in the engineering industry used to produce machine components ______________ diecasting.
a) is defined as [✓ b) is called] c) is known d) is called as

10) Ferromagnetic materials are also ______________ ferrites.
a) known b) called as [✓ c) known as] d) are called

11) A drill is an instrument ______________ holes are made. Which one is ***WRONG***?
a) by means of which b) by which c) with which [✓ d) on which]

12) Which one is ***WRONG***?
a) Turn off the radio c) Turn it off.
b) Turn the radio off [✓ d) Turn off it]

13) Energy consumption was ***reduced*** last year. ***Reduced*** is a synonym of:
[✓ a) cut down] b) cut off c) cut out d) cut up

14) *"In case of fire, extend this liquid over the fabric."* The expression that means **"In case of"** in this context is:
a) If not b) Provided that c) Whether [✓ d) In the event of]

15) The researcher who studies these materials is in the lab. ***Who studies*** can be shortened as:
a) studied [✓ b) studying] c) study d) to study

16) Thermionic diodes ______________ two electrodes in a vacuum.
[✓ a) consist of] b) makes up c) constituted d) are composed

17) A palmer ______________ obtain very accurate measurements.
a) is responsible for INF. c) performs the function of
[✓ b) serves to] d) enables

18) Electronic converters could be______________ line frequency converters and switching converters.
a) divided b) classified according to [✓ c) classified into] d) classified as

19) A tube used for the detection of radiations which has been previously filled with gas is:
a) a gas tube-radiations-detecting. [✓ c) a gas-filled radiation-detecting tube.]
b) a radiation-detecting gas tube-filled. d) a gas-filled detecting-radiations tube.

20) ______________ the plant was closed down was the lack of profits.
a) The reason for [✓ b) The reason why] c) The result of d) The reason ~~because~~
This is

21) They did not achieve the expected results, ______________ they stopped the production.
[✓ a) so] b) thus c) since d) as result
A

22) If the exhaust gas is black, this ____________ a rich mixture.

a) would indicate b) indicate c) indicated [✓ d) will indicate]

23) You are not allowed to do this exam ______________ you show me your ID (identity card).

a) if b) whether [✓ c) unless] d) in case

24) Printed circuit boards ____________ not absorb water (would spoil the insulation).

[✓ a) should] b) can c) might d) may

25) In measuring instruments, precision parts _____________ be protected against damage. Which one is ***WRONG***?

a) must b) shall [✓ c) may] d) should

26) _____________ they get sufficiently hot, all materials emit light; they become incandescent.

a) On condition [✓ b) Provided] c) As long d) In case

27) If power semiconductor devices _____________ in performance and _____________ in price, more applications would undoubtedly make use of power electronic converters.

a) had improved / fell
b) improve / fell
[✓ c) improved / fell]
d) would improve / would fall

28) Which one is ***WRONG***?

a) A barometer is used for measuring pressure. FOR + V. ING
b) The function of a barometer is to measure pressure.
[✓ c) A barometer is used for measur~~e~~ pressure.]
d) A barometer is used so as to measure pressure. IS USED – TO

29) Which one is ***RIGHT***? These rules are intended to____________________.

[✓ a) prevent accidents from happening.]
b) prevent accidents happening.
c) avoid accidents from happening
d) avoid accidents happening.

30) Cathodoluminescence is light emisson stimulated by electron bombardment. If the bombardment ___________ intense, more light ___________emitted. If this condition is **hypothetical** you have to use:

[✓ a) had been / would have been]
b) were / would be
c) is / will be
d) is / is

31) The nichrome element of an electric iron_________when connected to a suitable supply.

[✓ a) reddens] b) reds c) become red d) redizes

32) An instrument used for testing and operated by batteries is:

a) a battery-operated instrument test.
b) a batteries-operated test instrument.
c) a battery-operating instrument testing
[✓ d) a battery-operated test instrument.]

33) The current rose above the maximum.__________, the circuit-breaker opened to stop the current.

a) As b) Since [✓ c) Consequently] d) However

III. Read the text carefully and answer these questions.

Neural-net Computers: Computers That Can Learn.

*Nobody really knows how natural languages –the human brain– really work. Nevertheless, scientists are beginning to try to mimic on silicon chips the way information is handled by the brain. These new devices **(34)** ___________ neural-net computers.*

*Conventional computer circuits are linked in a series, with each transistor connected to only two or three other switches, **(35)**________ signals are processed step by step. This is known as the "von Neumann architecture", after computer genius John von Neumann, **(36)**____ formulated the design in the 1940s. Memory and processor are separated, with a communication link **(37) connecting** them --which means the processor must spend time waiting for data to be sent to and from it. This arrangement is fine for balancing financial records, performing mathematics, or playing chess, but it simply does not offer enough possibilities for doing tasks that nearly all humans can do, **(38) such as** recognize speech. **(39)***

*Neural nets, on the other hand, consist of transistors hooked up to many, many other switches, so that a signal will fan out across the whole network, and all the transistors will process it in parallel. This avoids the "von Neumann bottleneck." **(40) As a result**, developers say, computers can synthesize knowledge **(41) from data they have not dealt with before**. For example, after being trained to recognize a human face from a few angles, a neural-net computer can recognize it from an unfamiliar angle --a form of learning known as "pattern matching". Pattern matching is also important **(42)**_______________ speech. Language, for instance, is full of exceptions –the "a" sound may be long in "save," "gave," and "Dave," but it is short in "have." **(43)***

*The key to neural networks is that a great deal of processing can be **(44) going on** simultaneously-- something not possible with most supercomputers. As an article in* `Business Week` *(June 2, 1986), states, describing a neural-net computer developed by TRW near San Diego, Calif.: "Suppose, for example, that you **(45)** __________ to find the one person on earth whose height and weight comes closest to your own. A conventional supercomputer would take about seven minutes to slog through the statistics for 5 billion people, one by one. But with TRW's new neural network, the answer would pop out in roughly 75 thousandths of a second." **(46)** **(47)***

(From: Computers and Information Systems by T.J. O'Leary and Brian K. Williams. The Benjamin/Cummings Publishing Company, 1989. pp. 491-2)

34) [✓ a) are known as]   c) are defined AS
b) are named ~~as~~   d) are related to

35) a) in order to   [✓ b) so that]   c) so as to   d) for

36) a) which cual   b) whose cuyo   [✓ c) who que]   d) whom a quien

37) "**connecting**" (line 8) can be substituted by:
a) which are connected   c) who connects
[✓ b) that connects]   d) which connect

38) "**such as**" (line 11) is a synonym of:
a) namely   b) that is   c) as   [✓ d) like]

*39) One of these is __FALSE__ according to **paragraph 1 and 2:***

a) Nowadays scientists are working on silicon chips that can handle information in the same way a human brain does.

b) The "von Neumann architecture" is made up of circuits linked in series and step-by-step processed signals.

[✓ *c) John von Neumann created the first neural-net computer in the 1940s.*]

d) With conventional computers it is not possible to recognize speech since memory and processor are separated and only connected by a communication link.

***40) "As a result"** (line 14) cannot be substituted by one of these:*

a) That is the reason why *b) Due to this* *c) Therefore* [✓ *d) Since*]

41) The sentence "from data they have not dealt with" can also be correct as:

a) from which data they have not dealt with.

[✓ *b) from data with which they have not dealt.*]

c) from data with that they have not dealt.

d) from data with which they have not dealt with.

42) a) for recognize *b) for to recognition* [✓ *c) in recognizing*] *d) when recognition*

*43) One of the following is __FALSE__ according to **paragraph 3:***

a) With neural nets, transistors can process a signal in parallel.

[✓ *b) Pattern matching is a device that makes a computer synthesize knowledge and teaches it to recognize speech.*]

c) Pattern matching is helpful for speech recognition although it is not the perfect form of learning as language is full of exceptions.

d) Neural nets have different transistors connected to a lot of switches, therefore making it possible for signals to spread out over the whole network much more quickly than in a step-by-step process.

*44) **"going on"** (line 21) means:*

[✓ *a) taking place*] *b) achieving* *c) moving* *d) entering*

45) a) will want [✓ *b) wanted*] *c) would want* *d) would have wanted*

*46) Which of these is __FALSE__ according to the **4th paragraph?***

a) With neural networks any kind of statistics takes much less time than with conventional supercomputers.

b) Conventional supercomputers are unable to process data simultaneously.

c) Neural-net computers make it possible to process data much faster than conventional supercomputers due to the fact that it is done in parallel.

[✓ *d) With neural-net computers you can slog through statistics for billions of people very quickly provided you do it one by one.*]

*47) Which of these is __TRUE__ according to **the whole text?***

Neural-net computers.....

a) can perform all the tasks humans do, such as recognize speech.

b) can imitate with conventional computer circuits linked in a series the way information is processed in a human brain.

c) can distinguish exceptions by using a method known as pattern matching.

[✓ *d) can learn and synthesize information by using a method known as pattern matching.*]

IV. Read the text carefully and answer these questions.

ANTENNAS.

An antenna is defined by Webster's Dictionary as "a usually metallic device (as a rod or wire) for radiating or receiving radio waves." The IEEE Standard Definitions of Terms for Antennas (IEEE Std 145-1973) defines the antenna or aerial as "a means for radiating or receiving radio waves." In other words the antenna is the transitional structure between free-space and a guiding device. The guiding device or transmission line may take the form of a coaxial line or a hollow pipe (waveguide), and it is used to transport electromagnetic energy from the transmitting source to the antenna, or from the antenna to the receiver. In the former case we have a transmitting antenna and in the latter a receiving antenna.

In addition to receiving or transmitting energy, an antenna is usually required to optimize or accentuate the radiation energy in some directions and suppress it in others. ***(48) Thus*** the antenna must act as a directional device in addition to a probing device. It must then take various forms ***(49) to meet the particular need at hand***, and it may be a piece of conducting wire, an aperture, an assembly of elements (array), a reflector, a lens, and so forth. ***(50)***

Types of antennas.

We will now introduce and briefly discuss some forms of the various antenna types in order to get a glance as to what will be encountered in the remainder of the book.

Wire antennas are familiar to the layman because they are seen virtually everywhere --on automobiles, buildings, ships, aircraft, and so on. There are various shapes of wire antennas such as a straight wire (dipole), loop, and helix. Loop antennas need not only be circular. They may take the form of a rectangle, square, ellipse, or any other configuration. The circular loop is the most common ***(51)***____________ its simplicity in construction. ***(52)***

Aperture antennas may be more familiar to the layman today than in the past because of the increasing demand for more sophisticated forms of antennas and the utilization of higher frequencies. Antennas of this type are very useful for aircraft or spacecraft applications, because they can be very conveniently flush-mounted on the skin of the aircraft or spacecraft. In addition, they can be covered with a dielectric material to protect them from hazardous conditions of the environment. ***(53)***

Many applications require radiation characteristics that may not be achieved by a single element. It may, however, be possible that an aggregate of radiating elements in an electrical and geometrical arrangement (an array) will result in the desired radiation characteristics. The arrangement of the array may be such that the radiation from the elements adds up to give radiation maximum in a particular direction or directions, minimum in others, or otherwise as desired. Usually the term array is reserved for an arrangement in which the individual radiators are separate. However the same term is also used to describe an assembly of radiators mounted on a continuous structure. ***(54)***

The success in the exploration of outer space ***(55) has resulted in*** the advancement of antenna theory. Because of the need to communicate over great distances, sophisticated forms of antennas had to be used in order to transmit and receive signals that had to travel millions of miles. A very common antenna form for such an application is a parabolic reflector. Antennas of this type have been built with diameters as large as 305 m. Such large dimensions are needed to achieve the high gain required to transmit or receive signals after millions of miles of travel. Another form of a reflector, although not as common as the parabolic, is the corner reflector. ***(56)***

Lenses are primarily used to collimate incident divergent energy to prevent it from spreading in undesired directions. By properly shaping the geometrical configuration and choosing the appropriate material of the lenses, they can transform various forms of divergent energy into plane waves. They can be used in most of the same applications as are the parabolic reflectors, especially at higher frequencies. Their dimensions and weight become exceedingly large at lower frequencies. Lens antennas are classified according to the material from which they are constructed, or according to their geometrical shape. ***(57)***

In summary, an ideal antenna is one that will radiate all the power delivered to it from the transmitter in a desired direction or directions. In practice, however, such ideal performances cannot be achieved but many may be closely approached. Various types of antennas are available and each type can take different forms in order to achieve the desired radiation characteristics for the particular application. ***(58)***

(From: Antenna Theory, Analysis and Design by C.A. Balanis. Ed. Wiley, 1982. pp.1-6)

48) ***"Thus"*** (line 14) is a synonym of:
a) Since [✓ b) Hence] c) Moreover d) However

49) ***"to meet the particular need at hand"*** (line 15) means:
a) to find out a specific need c) to give up a specific need
b) to put up a specific need [✓ d) to satisfy a specific need]

50) Which of these is **FALSE** according to **paragraphs 1 & 2**?:
a) An antenna is usually a metallic device used for either radiating or receiving **radio waves**
b) Both an antenna and an aerial are exactly the same thing.
[✓ c) The fact that an antenna is a transmitting antenna or a receiving antenna depends on the form of the antenna.]
d) A transmitting antenna is one in which the transmission line transports electromagnetic energy from the transmitting source to the antenna.

51) a) because [✓ b) because of] c) since d) provided

52) Which of these is **FALSE** according to the **4th paragraph**?:
Loop antennas.....
a) belong to one kind of wire antennas.
b) are one of the shapes of wire antennas.
[✓ c) have to be circular.]
d) can take different configurations.

53) In the **5th paragraph**, What is the real reason why ***Aperture antennas are mainly used for aircraft or spacecraft applications?***
a) Because they can be used at higher frequencies.
b) Because they can be covered with a dielectric material.
[✓ c) Because they can be flush-mounted.]
d) Because they are more sophisticated for the conditions of the environment.

54) Which one is **FALSE** according to the **6th paragraph**?:

An array....

- [✓ a)] is needed in many applications provided the radiation characteristics can be achieved by only one element.
- b) is a set of radiating elements in an electrical and geometrical arrangement.
- c) can control the amount of radiation in a direction due to the arrangement of its elements.
- d) can be an arrangement in which individual radiators are separate or an assembly of radiators mounted on a continuous structure.

55) ***"has resulted in"*** (line 44) can be substituted by:

[✓ a)] has led to	c) has been caused by
b) has been produced by	d) has resulted from

56) Which one is **TRUE** according to the **7th paragraph**?:

- a) The advancement of antenna theory has brought about the exploration of outer space.
- [✓ b)] Huge parabolic reflectors are used in the exploration of outer space since they can achieve the high gain required for transmitting and receiving signals over great distances.
- c) Only parabolic reflectors can achieve the high gain needed to transmit or receive signals in outer space.
- d) The corner reflector is a more sophisticated type of parabolic reflector.

57) Which one is **TRUE** according to the **8th paragraph**?:

- a) Lens antennas can only be used at high frequencies.
- [✓ b)] Lens antennas avoid the spreading of divergent energy in undesired directions because they change this type of energy into plane waves.
- c) Lens antennas are very similar to parabolic reflectors.
- d) The classification of lens antennas is based on the frequency for which they are used.

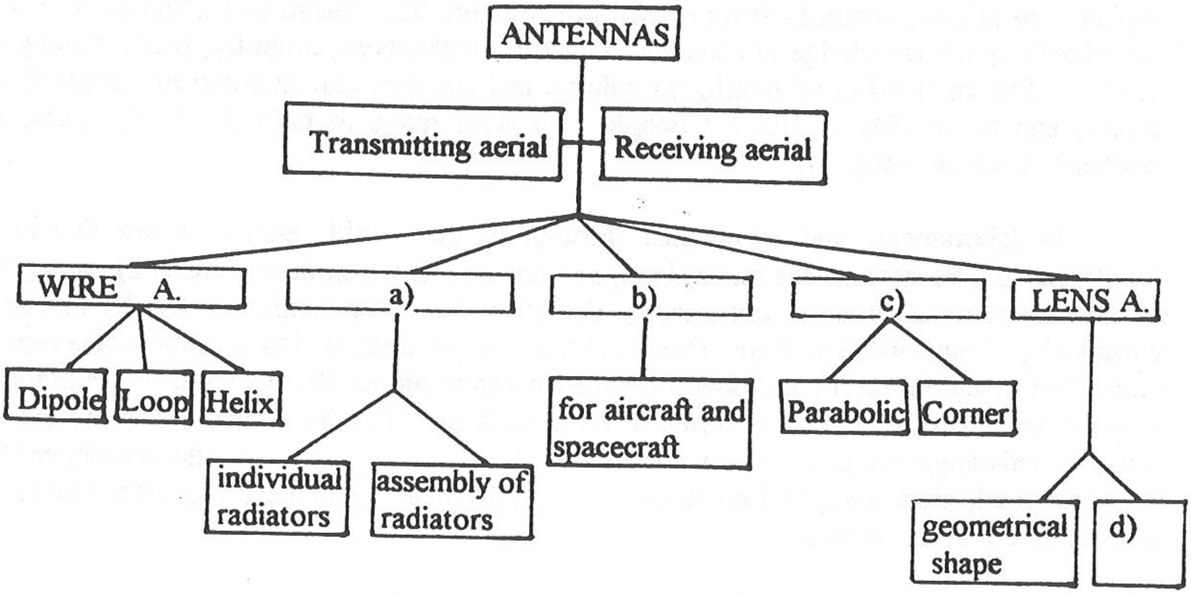
58) Which one is **TRUE** according to **the last paragraph**?:

An ideal antenna....

- a) will not always radiate the energy delivered to it from the transmitter in the desired direction or directions.
- [✓ b)] should be able to radiate the energy delivered to it from the transmitter in the desired direction or directions.
- c) should have only one form to achieve the desired radiation characteristics for all kinds of applications.
- d) can take different forms but all of them serve for many different applications.

59) Choose the appropriate word to complete this classification:

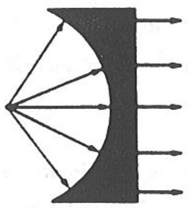
a) a.- Aperture a. b.- Reflector a. c.- Material d.- Dimensions
b) a.- Array a. b.- Reflector a. c.- Aperture a. d.- Material
[✓ c)] a.- Array a. b.- Aperture a. c.- Reflector a. d.- Material
d) a.- Aperture a. b.- Array a. c.- Reflector a. d.- Frequency



60) Identify which option corresponds to the numbers of these figures:

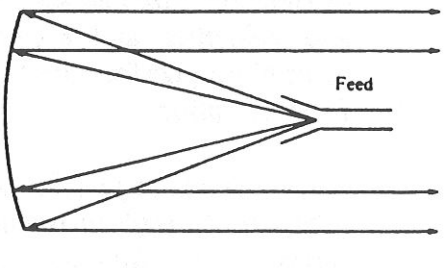
a) 1.- Aperture a. 2.- Parabolic a. 3.- Wire a. 4.- Lens a.
b) 1.- Reflector a. 2.- Wire a. 3.- Lens a. 4.- Aperture a.
c) 1.- Wire a. 2.- Lens a. 3.- Aperture a. 4.- Reflector a.
[✓ d)] 1.- Lens a. 2.- Aperture a. 3.- Reflector a. 4.- Wire a.

1.-

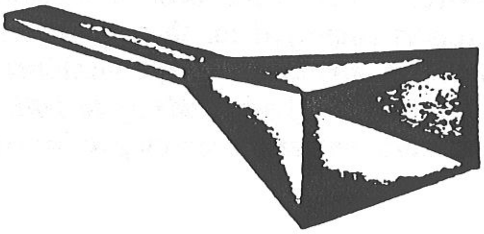


Concave–plane

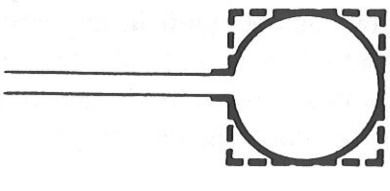
3.-



2.-



4.-



V. Read the text carefully and answer these questions.

Advances in intelligent robotics are resulting in a new generation of programmable, sensory-interactive, ***(61) computer-controlled machines*** capable of operating with human supervision or autonomously from sensed information. The design and integration of these machines require knowledge of actuators, control, mechanisms, mobility, programming and sensors. The application of intelligent robotic technologies can increase the productivity, safety, and the quality of life for people in a wide range of tasks for land, space, and undersea environments[...].

In laboratories and companies throughout the world, engineers are developing intelligent robotic systems for space, land, and undersea environments. The ***(62) emergence*** of intelligent robotics as an engineering discipline has been motivated by the increasing complexity of automated systems. Previously, it was possible to view a robot as a computer-controlled machine tool or peripheral device operating alone. Robots were preprogrammed to perform a specific task or a series of tasks with only low-level feedback from external sensors. This approach is no longer possible *(63)*_________________ the interdependence of mechanical, electronic, and computational requirements of modern computer-controlled, sensory-interactive machines.

Robots produce mechanical motion that ***(64) results in*** manipulation or locomotion. Industrial robots manipulate parts and tools to perform manifacturing tasks such as material handling, welding, spray painting, and assembly. Automated guided vehicles transport materials in factories and warehouses. Telerobotic mechanisms provide manipulation capabilities in space and undersea. Walking robots have application in hazardous environments. In contrast to early preprogrammed robots, intelligent robots can operate in partially structured and unstructured environments by the use of advanced sensory feedback mechanisms, and make decisions using learning and reasoning algorithms.

Mechanical characteristics for robotic mechanisms *(65)*_________________ degrees of freedom, size and shape of workspace, stiffness and strength of structure, lifting capacity, and velocities and accelerations under load. Mechanical design is a major factor in determining performance measures such as repeatability, positioning accuracy, and freedom from vibration.

The first justification for robots was to replace humans in dangerous and repetitive jobs, and to replace fixed-automation systems with more flexible equipment that could be reprogrammed for new situations. *(66)*_________________ their limited sensory capabilities, early robots were best suited to tasks with clearly prescribed paths of motion. Uses of these devices occurred mainly in material transfer, machine loading and unloading, spot welding, and spray painting. Applications of industrial robots have been dominated by simple manufacturing tasks for many years. The robots employed for these purposes range from small models with lifting capacities of several pounds to very large machines that can lift hundreds of pounds. For heavy lifting tasks involving ***(67) payloads up to 1000lb***, overhead gantry robots were developed. Kinematic configurations vary according to the size and shape of the workspace envelope.

With later developments in robotics, industrial applications exploited the robot's speed and accuracy in precision drilling, light machining tasks, gluing and fastening, small parts assembly, packing, sealing, testing, and measuring. Robots developed for these tasks have repeatabilities exceeding ±0.025mm and move at high speeds. They are often fitted with customized end-effectors that *(68)*________________ be quickly connected or disconnected under programmed control.

From: IEEE Transactions Industrial Electronics, VOL. 41, N° 1, February 1994, pp 4-10.

61) ***Computer-controlled machines*** are:
  a) machines that control computers
  [✓ b) machines controlled by computers]
  c) computers that control machines
  d) computers controlled by machines

62) Which of the following could ***NOT BE USED*** instead of ***emergence***?
  a) appearance b) rise c) development [✓ d) performance]

63) [✓ a) due to] c) so
  b) because d) since

64) ***Results in*** is a synonym of:
  [✓ a) brings about] c) is caused by
  b) results from d) is produced by

65) a) constitute b) includes [✓ c) comprise] d) form

66) a) Since b) As a result c) Because [✓ d) Because of]

67) ***Payloads up to 1000lb*** are :
  a) Payloads of exactly 1000lb
  b) Payloads of more than 1000lb
  c) Payloads of less than 1000lb
  [✓ d) Payloads between 1lb and 1000lb]

68) a) must b) should [✓ c) can] d) might

69) Choose the best title for this text.
  a) Intelligent machines
  [✓ b) Intelligent robotics in manufacturing]
  c) The latest developments in industrial robotics
  d) Walking robots

70) Which is *FALSE* according to the **first paragraph**?

[✓ a)] Computer-controlled machines can always operate without human supervision.
b) The new generation of computer-controlled machines results from advances in intelligent robotics.
c) The application of intelligent robotic technologies makes some types of work safer.
d) The application of intelligent robotic technologies reduces the safety, productivity and quality of life for people in a wide range of tasks.

71) Which is *FALSE* according to the **second paragraph**?

a) Before, robots were preprogrammed to perform a specific task.
b) Before, a robot was viewed as a device which operated alone.
[✓ c)] Today robots are also viewed as a machine tool or peripheral device operating alone.
d) Today many different interdependent factors contribute to the operation of robots.

72) Which is *FALSE* according to the **third paragraph**?

a) Industrial robots produce the necessary mechanical motion for parts and tools to perform tasks such as material handling, welding, spray painting and assembly.
b) Differents types of robots are used depending on the environment they are going to be used.
[✓ c)] Intelligent robots, in the same way as the early preprogrammed robots, can make decisions by using learning and reasoning algorithms.
d) The use of advanced sensory feedback mechanisms allows robots to make certain types of decisions.

73) Which is *TRUE* according to the **fifth paragraph**?

[✓ a)] Some of the first applications of industrial robots were tasks such as material transfer, machine loading and unloading, spot welding, and spray painting.
b) Early industrial robots replaced humans in complex, dangerous and repetitive tasks.
c) Many workers in factories were sacked because they were doing dangerous and repetitive jobs.
d) Soon after the first industrial robots appeared, new robots were developed to perform complex manufacturing tasks.

74) Which is *TRUE* according to the **sixth paragraph**?

a) Some of the latest industrial applications include speed and accuracy in precision drilling, light machining tasks, gluing and fastening, small parts assembly, packing, sealing, testing and measuring.
[✓ b)] Some of the industrial applications that were developed after the simple manufacturing tasks performed by robots include speed accuracy in precision drilling, light machining tasks, gluing and fastening, small parts assembly, packing, sealing, testing and measuring.
c) Robots developed for these tasks are very accurate but rather slow.
d) These robots can be manually connected or disconnected.

VI . Read the text carefully and answer these questions.

'GREEN' REFRIGERATORS

Not since the electric refrigerator replaced the icebox has home refrigeration technology undergone so drastic an overhaul.

The humble refrigerator today is one of the home's main users of both ozone-depleting chemicals and energy. But by the end of 1995, chlorofluorocarbons, the *(75)* ***ozone-depleting compound*** used in refrigerators, will be banned worldwide, according to the Montreal protocol (established in 1987 under the auspices of the United Nations). Meanwhile, governments are taking steps to establish new standards or *(76)* ***tighten*** existing ones on refrigerator energy use. These twin forces are driving a wave of research and development in refrigeration technologies. Existing technologies are being adapted to new chemicals, processes are being refined to become more energy efficient, and innovative approaches to refrigeration are being tested.

OZONE ANXIETY. In the 1970s, scientists found that chlorofluorocarbons (CFCs) were contributing to the destruction of the Earth's ozone layer. The problem comes from the chlorine in CFCs, which binds with oxygen to dismantle ozone molecules in the upper atmosphere. *(77)*______________ the ozone protects the Earth from the Sun's *(78)*______________ ultraviolet radiation, less of it means more radiation *(79)* ***passing through***, causing a substantial increase in skin cancer, as well as increases in cataracts and immune system problems.

In 1986, with the discovery of a hole in the ozone over Antarctica, addressing the problem of ozone destruction became a worldwide imperative. *(80)*______________ an international agreement has decreed that after Dec. 31, 1995, CFCs will no longer be produced by anybody for anything.

Already efforts to eliminate them are in progress. They have long been replaced as an aerosol propellant in the United States. Most *(81)* ***printed-circuit board manufacturers***, who used CFCs for solvents, have exchanged them for ozone-friendly substitutes. And refrigerator manufacturers are on track to eliminate CFCs from their products. In fact, the first *(82)* ***CFC-free refrigerators*** have been on the market for some time.

Developed in the 1930s, CFCs were quickly embraced by the refrigeration industry as a coolant. They seemed nontoxic --so safe, it was thought, people could wash in them. Moreover,they were welcome substitutes for the somewhat dangerous sulphur dioxide, ammonia, and methyl chloride *(83)*______________ .In the 1960s, the industry found another use for CFCs: as a blowing agent to create foam insulation that was more effective--and therefore more energy efficient-- than the fiberglass insulation refrigerators were using.

But eliminating CFC coolants today will require a lot more effort than just returning to the use of their predecessors. Safety regulations and product liability standards now proscribe employing any toxic coolants, and energy conservation concerns prohibit working with less efficient insulation.

From: IEEE Spectrum, August 1994, pp 25-30.

75) What is an ***ozone-depleting compound***?

a) a compound which is being depleted by ozone
b) ozone which depletes compounds
c) a compound depleted by ozone
[✓ d) a compound that deplets ozone]

76) ***Tighten*** is a synonym of:

[✓ a) fix] b) constriction c) tight d) narrowed

77) a) Because of b) Due to [✓ c) As] d) As a result of

78) [✓ a) harmful] b) harmless c) helpful d) danger

79) ***Passing through*** can be substituted by:

a) that passed through
b) who passes through
[✓ c) which passes through]
d) through which passes

80) Which one is ***WRONG***?

a) Consequently, [✓ b) As a result of] c) As a result, d) For this reason,

81) Which one is ***FALSE***? ***A printed-circuit board manufacturer*** is:

a) a manufacturer of boards which have printed circuits
b) a manufacturer of boards containing printed circuits
[✓ c) a manufacturer of boards which print circuits]
d) a manufacturer of boards with circuits printed on them

82) What are ***CFC-free refrigerators***?

a) refrigerators which release CFCs
b) refrigerators using CFCs
c) refrigerators that give off CFCs
[✓ d) refrigerators without CFCs]

83) Which one is ***WRONG***?

a) used then as coolants
[✓ b) using then as coolants]
c) which were used then as coolants
d) being used then as coolants

84) Which is ***TRUE*** according to the first paragraph?

a) The Montreal protocol says that the use of CFCs in refrigerators will be banned all over the world by the end of 1995. Meanwhile, governments are trying to reinforce the use of the existing ones.
[✓ b) Both the Montreal protocol and governments are forcing researchers to investigate more energy efficient and innnovative approaches to refrigeration.]
c) The chemicals used in most of the present refrigerators are slightly contributing to the destruction of the ozone layer.
d) New approaches to refrigeration are not being developed yet.

85) Which is ***FALSE*** according to the **second paragraph**?

a) CFCs are still contributing to the destruction of the ozone layer.
b) The chlorine found in CFCs together with oxygen damages the ozone layer molecules.
[✓ c) The thinner the ozone layer is, the less the Sun's radiation passes through.]
d) The strong Sun's ultraviolet radiation, without the protection of the ozone layer is causing an increase in different diseases.

86) Which is ***FALSE*** according to the **third and fourth paragraphs**?

[✓ a) After Dec. 31, 1995 nobody --not even the people who have the old refrigerators will be allowed to use CFCs.]
b) Efforts to replace CFCs for other chemicals are being made.
c) Printed-circuit board manufacturers and refrigerator manufacturers are trying to use alternative chemicals, instead of CFCs, in their products.
d) There are already CFC-free refrigerators on the market.

87) Which is ***TRUE*** according to the **fifth paragraph**?

a) Sulphur dioxide, ammonia and methyl chloride were less dangerous than CFCs.
b) Fiberglass insulation was more effective than foam insulation.
c) Fiberglass insulation refrigerators use foam.
[✓ d) Between 1930s and the 1960s two different applications were found for CFCs, first as coolants and second to create foam insulation in refrigerators.]

88) Which is ***FALSE*** according to the **sixth paragraph**?

a) Eliminating CFCs today is not an easy task.
[✓ b) Researchers are thinking of returning to the use of old coolants.]
c) Safety regulations will not allow the use of any toxic coolant.
d) Not working with more efficient insulation than that provided by CFCs is prohibited by energy conservation concerns.

TEST 6

I.- ***Identify the mistake* in these sentences.**

1) ***(a) Classical mechanics*** always ***(b) provides*** excellent predictions ***(c)provided*** the velocities ***(d) were*** much smaller than the velocity of light.

2) MOS transistors ***(a) are classified as*** p-channel or n-channel devices ***(b)depending on*** the conductivity type of the channel region. In addition, these devices can also be classified ***(c)according*** their mode of operation ***(d) as*** enhancement or depletion types of devices.

3) If ***(a) there was*** more proposals of Final Projects, many more students ***(b) would be able to finish*** their ***(c)university studies*** earlier. ***(d) Thus***, it should be desirable that more departments offered more and new proposals.

4) The most important advantage of switching regulators over the conventional series regulator is their greater efficiency, ***(a) due to*** the pass device is operated as a ***(b)low-impedance switch.*** When the pass device is cutoff, ***(c) there will be*** no current through it. ***(d) Therefore***, it dissipates no power.

year

5) ***(a) I'm a third-course Electronics student*** at Vilanova. Next year I'll try to ***(b) finish my studies*** and ***(c)get my degree.*** I hope that my ***(d) university training*** will help me to get a job soon.

6) It was not ***(a) until*** 1958 that microelectronics began with the development of ICs (integrated circuits) on silicon chips. This ***(b) brought about*** a great increase in the use of electronics in everyday items. The introduction of the microprocessor ***(c)allowed*** electronics ***(d) being used for*** the control of many common processes.

7) A telephone network ***(a) can be used to*** connect personal computers ***(b) to*** an electronic mail system (e-mail). ***(c) Therefore***, a different channel of communication has to be used, ***(d) such as*** radiolinks, to send and reply to an electronic message.

WHY

8) ***(a) The reason because*** the system did not work was because ***(b) there was*** a failure in one of the components. So the system had to be checked carefully before technicians could ***(c) find out*** why the whole system ***(d) went down***.

II. Choose the right option. Only one is correct.

9) Because the problem described here is fairly simple, the programmer ____________ choose to write the program in a general purpose language such as basic. Which one is **WRONG**?

a) might [✓ b) must] c) could d) may

10) Speed is important in robot vision because visual information ________________ be used in real time by the control system to correct the robot's movements.

[✓ a) must] b) can c) could d) might

11) The temperature ***may*** drop to zero. ***May*** can be substituted by:

a) is certain to b) is likely to [✓ c) will perhaps] d) is possible to

12) An intelligent house is a building ________________ mechanisms are computer-controlled.

a) ~~who~~ b) which c) that [✓ d) whose] who

13) The computer graphics package ________________ he is working with is very useful. Which one is **WRONG**?

a) which b) that c) Ø [✓ d) who] + SUBJ // WRONG

14) The two electrode reactions which were separate thermodynamic systems have become joined ________________ make a single thermodynamic system. Which one is **WRONG**?

[✓ a) for to] !! b) so as to c) to d) in order to

15) Power electronics ________________ the flow of power by shaping the utility-supplied voltages by means of power semiconductor devices.

a) control [✓ b) regulates] c) performs the function of d) are responsible for

16) Power electronic systems ________________ one or more power electronic converters which utilize power semiconductor devices controlled by integrated circuits.

a) make up b) constitute [✓ c) consist of] d) is composed of

17) Petrol is stored in underground tanks to ________________ accidents from happening. Which one is **WRONG**?

a) prevent [✓ b) avoid] TO c) stop d) keep

18) If robot motion ________________ to accomodate moving obstacles, multiple devices ______________ safely in the same workspace by planning a task for one robot with all other motions regarded as obstacles.

[✓ a) were planned / could be operated]
c) was planned / could be operated
b) is planned / could be operated
d) plans / can be operated

19) Which sentence **DOES NOT MEAN THE SAME** as the others?

a) If the water level is not reduced, the dam will overflow.
b) The dam will not overflow if the water level is reduced.
c) Unless they reduce the water level, the dam will overflow.
[✓ d) The dam will not overflow unless the water level is reduced.]

20) The alarm bell will ring ______________ a window is opened.

a) in the event of   b) in case of   [✓ c) in case]   d) in event of

21) If you want to get steam, the temperature of water must be raised sufficiently, ______________ it doesn't boil.

a) provided   b) only if   c) on condition that   [✓ d) otherwise]

III. Read the text carefully and choose the right option.

INTEGRATED-CIRCUIT OSCILLATORS:

AN OVERVIEW OF OSCILLATOR TYPES.

As an general classification, electronic circuits ***(22) can be divided into*** two categories: signal-processing circuits which operate on existing signals, to vary their characteristics; and signal-generating circuits which produce or generate their own periodic signals. All of the circuit types discussed so far, *(23)*__________ amplifiers, regulators, modulators, and mutltipliers, fall into the first category. Oscillators, which will be covered in this chapter, fall into the second.

The function of an oscillator is *(24)*____________ a steady and stable, *(25)*__________________________________ which can serve as the information or timing signal for the signal-processing circuits. The ac output signal ***(26) available*** from an oscillator can be in any one of a variety of waveforms, such as sinusoidal, triangular, square wave, pulse train, or exponential ramp. Oscillators offer a multitude of applications. They can be used to generate clock signals for system timing, or they may be used to generate the carrier signal which can be modulated in amplitude or frequency to transmit information. In addition, they can produce periodic sweep voltages for display systems or convert analog voltage or current data into frequency. Oscillators are also key building blocks in complex ***(27) signal-processing systems*** such as phase-locked loops and frequency synthesizers.

Categorically, oscillator circuits can be ***(28) broken down*** into two classes: tuned oscillators which produce nearly sinusoidal outputs, and multivibrator circuits which switch back and forth between two astable states.

The tuned oscillators, which are also called harmonic or near-harmonic oscillators, usually require *LC*-tank circuits or crystals as the frequency-setting components. Ideally, such oscillator circuits simulate the response of a ***(29) lossless*** *LC*-tank circuit, that is, they correspond to a pair of complex-conjugate poles exactly on the jw-axis of the complex frequency plane.

The multivibrators, ***(30) which are also called*** relaxation oscillators or charge-discharge oscillators, operate by alternately charging and discharching an energy storage element (normally a capacitor) between two internally set threshhold levels within the circuit. In this manner, the circuit relaxes into one astable state until it reaches one of the internal threshold levels; then it is switched and is switched back to the first astable state; and the cycle continues in this manner. The output of a multivibrator is normally a series of linear or exponential ramp waveforms across the energy storage element and a series of pulse or square-wave signals across the switching components.

(From: *Bipolar and MOS Analog Integrated Circuit Design* by Alan B. Grebene. John Wiley and Sons, 1984. (Chapter 11, p.541-2)

22) "***can be divided into***" can be substituted by:
a) can be classified as c) can belong
[✓ b) can be made up of] d) can consist in

23) a) namely b) as [✓ c) such as] d) example

24) a) producing b) for producing c) produce [✓ d) to produce]

25) ***The output waveform which varies with periodic time*** is:
[✓ a) periodic time-varying output waveform]
b) waveform output-varying periodic time
c) varied- periodic time output waveform
d) waveform-varied periodic time output

26) "The ac output signal ***available*** from an oscillator" means in the text:
a) that comes from the ac output signal
[✓ b) that can be obtained from an oscillator]
c) that is introduced into the oscillator
d) that generates the ac output signal

27) "***signal-processing systems***" can be defined as three of the following. Choose the **WRONG ONE:**
a) systems which can process signals
b) systems used for signal processing
c) systems for the processing of signals
[✓ d) systems that can be processed by signals]

28) "***broken down***" in the text means:
a) that need to be repaired
[✓ b) that can be classified into]
c) that break very easily
d) that are separated

29) "***lossless***" means:
a) that the circuit can be lost
b) that the circuit is loose
c) that the circuit suffers losses all the time
[✓ d) that the circuit suffers no losses]

30) "***which are also called***" can be substituted in the text by: ≡ ALSO CALLED
a) also naming
[✓ b) also known as] CALLED
c) also related
d) also defining as

FINISH THIS CLASSIFICATION ACCORDING TO THE INFORMATION GIVEN IN THE TEXT.

31) a) Signal-generating circuits
[✓ b) Signal-processing circuits]
c) Existing signals
d) Periodic signals

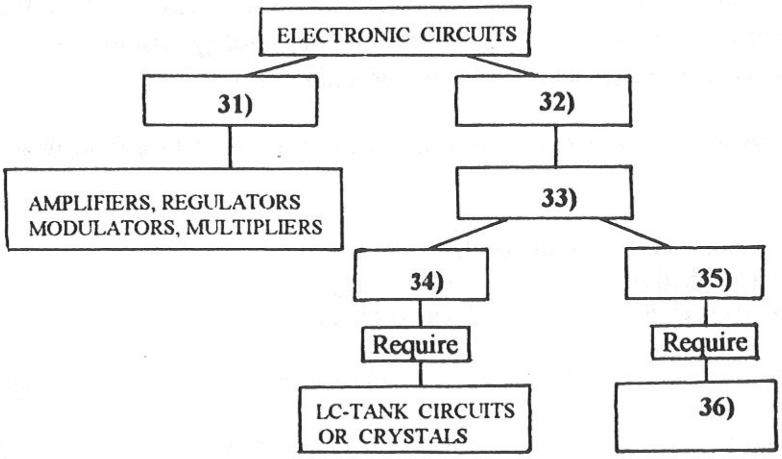
32) [✓ a) Signal-generating circuits]
b) Signal-processing circuits
c) Characteristics
d) Circuit types

33) a) Multipliers
b) Waveforms
[✓ c) Oscillators]
d) Frequency synthesizers

34) a) Capacitors
b) Charge-discharge oscillators
c) Relaxation oscillators
[✓ d) Tuned oscillators]

35) a) Harmonic oscillators
b) Frequency -setting components
[✓ c) Multivibrators]
d) Astable oscillators

36) a) Relaxation oscillators
[✓ b) Capacitor]
c) Square-wave signal
d) Threshold level


ELECTRONIC CIRCUITS
31)
32)
AMPLIFIERS, REGULATORS MODULATORS, MULTIPLIERS
33)
34)
35)
Require
Require
LC-TANK CIRCUITS OR CRYSTALS
36)

IV. Read the text carefully and choose the right option. Only one is correct.

Before you can send a message as voice, video, data, or whatever, you need some sort of device at your end of the communications line that will convert your ideas into the signal to be transmitted. A telegraph key is one example of such a communications interface, a telephone handset is another, a microphone is still another.

Here we are principally concerned with sending computer data. Because of the extensive telephone network already in place throughout North America and the world, a great deal of computer communications is over telephone lines. The telephone was built for voice transmission, which requires an analog signal --an electronic signal that will represent a range of frequencies. However, most input and output devices and most CPUs will only send and receive digital signals, which are merely the presence or absence of an electronic pulse. ***(37)***

The device that converts digital signals to analog and reverse is a modem, the tool for communications interfacing. ***Modem*** is short for "***mo***dulate/***dem***odulate; modulation is the name of the process of converting from digital to analog and demodulation from analog to digital.

As Figure 10-1 shows, a modem may be an acoustic coupler modem or a direc-connect modem. An acoustic coupler is a modem with a cradle of rubber cups that will accept a standard telephone handset; this kind of modem is not used as much now, primarily because it is slow at transmitting and receiving data. A direct-connect modem connects directly to a telephone line. For microcomputers, direct-connect modems are of two types: stand-alone and internal. The stand-alone modem stands apart from the computer and is connected by a cable to the computer's serial port. The internal modem is usually a plug-in-circuit board that you may have installed at a computer store, but in some portable computers it is built in at the factory. Both types have modular telephone jacks in their rear pannels. With one you connect the modem to the telephone wall jack; with the other you plug in your telephone so that you can do both voice communication and data communication over the same telephone line. ***(38)***

Data travels in two ways --serially and in parallel. With serial data transmission, bits flow in a continuous stream, like cars crossing a one-lane bridge; the bits flow in a series. With parallel data transmission, each bit ***(39) making up*** a character flows through a separate line at the same time as the others, like cars moving together at the same speed on a freeway with several lanes. Serial transmission is the way most data are sent over telephone lines, and the plug-in board making up the serial connector in a microcomputer's modem is usually called a serial port, although it may also be called an RS-232C connector or an asynchronous communication port. Parallel transmission is not used for communications over telephone lines, although it is a standard method of sending data from a computer to a printer. ***(40)***

(41) The speed with which information is sent is expressed in baud rates or bits per second (bps). ***(42)***___________ industry standardization, only a few different bps speeds are used for personal computers. They include 300, 1,200, 2,400, 4,800, and 9,600 baud rates. In most computer systems, a baud is equivalent to one bit, and baud rates can be converted to bps directly. ***(43) That is,*** 300 baud equals 300 bps, and so on.

Not all computer communications must be converted from digital to analog and back. In computer systems where input, output, CPU, and secondary storage are all reasonably close together --within the same building, say-- data can be transmitted digitally through special cables. Also, Sprint ***(44) has installed*** a nationwide fiber optic network *(45)*________ essentially the process will be reversed from that of the present telephone system: digital data will be converted to analog signals for transmission. ***(46)***

(**From: COMPUTERS AND INFORMATION SYSTEMS by O'Leary / Williams. Benjamin / Cummings Publishing Co., Arizona State University. 1989, p. 321-322)**

37) According to paragraphs 1 and 2, **WHICH ONE IS *FALSE?***

a) A communications interface is a device that turns voice, video, data or whatever kind of message into a signal to be transmitted.

b) The sending of computer data and computer communications are done mainly by means of telephone lines due to the wide telephone network existing all over the world.

[✓ c) The problem with computer communications is that they cannot be used over telephone lines unless there is a device capable of converting digital signals into the analog signals needed for voice transmission.]

d) Computer communications over telephone lines are possible provided there is a device that converts analog signals into the digital signals that computers can send and receive.

38) According to paragraphs 3 and 4, **WHICH ONE IS *TRUE?***

a) A modem is a communications interfacing device that can modulate and demodulate signals, that is, that can just convert digital into analog signals.

[✓ b) Acoustic coupler modems are not used very often because they cause delays in data transmission and reception.]

c) Direct-connect modems, another kind of acoustic coupler modems, can be divided into stand-alone and internal.

d) Both stand-alone and internal modems allow the user to have only voice communication over the telephone line.

39) "***making up***" can be substituted by:

[✓ a) that forms]   b) which are made of   c) which avoids   d) that speed up

40) According to paragraph 5, **WHICH ONE IS *TRUE?***

Parallel transmission......

a) consists of bits flowing through telephone lines at the same time.

b) needs an asynchronous communication port in order to send data from a computer to a printer.

c) needs a connector in a microcomputer's modem to prevent data from flowing in a series.

[✓ d) allows data to be sent from a computer to a printer even though communications over telephone lines need to be done serially.]

41) "***The speed with which information is sent is expressed in baud rates***" can also be rewritten as:

a) The speed which information is sent is expressed with in baud rates.

b) The speed whom information is sent with is expressed in baud rates.

c) The speed that information is sent with is expressed in baud rates.

[✓ d) The speed information is sent with is expressed in baud rates.]

42) One of the following ***CANNOT BE USED*** here. **WHICH ONE?**

[✓ a) Because]   b) Because of   c) Due to   d) Owing to

43) "***That is,***" can be substituted by:

a) Such as   b) Like   [✓ c) Namely]   d) Example

44) "***has installed***" is a synonym of:

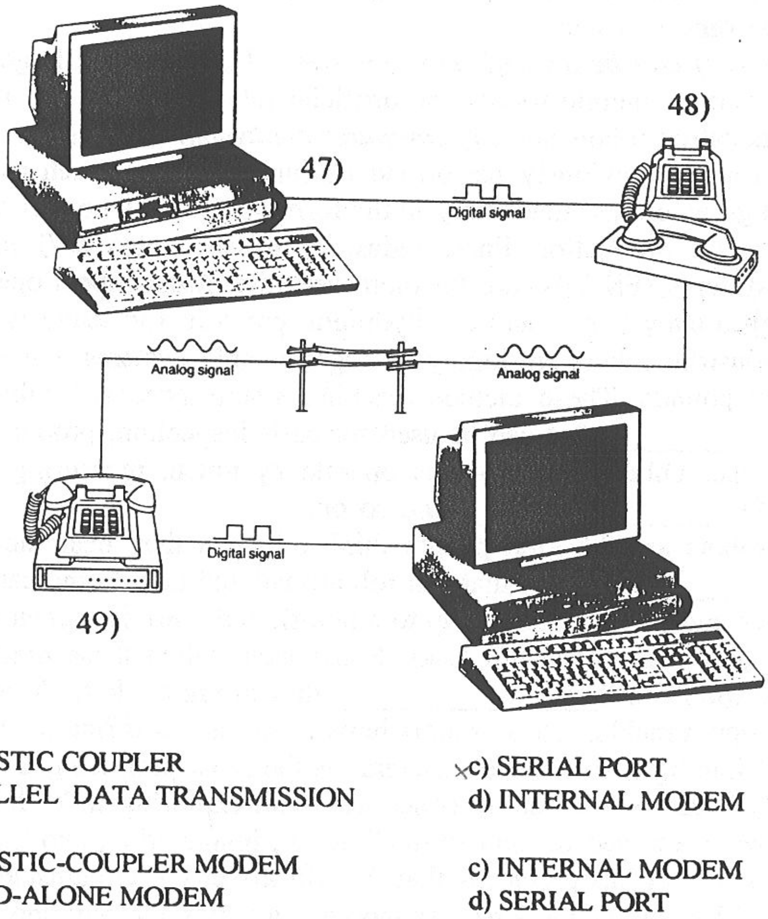
a) has found out   [✓ b) has set up]   c) has put up   d) has stood on

45) a) around that b) for which c) whose [✓ d) in which]

46) According to paragraphs 6 and 7, **WHICH ONE IS *TRUE?***

a) Speed information can be expressed in baud rates or bps.
[✓ b) Data can be transmitted digitally through special cables as long as input, output, CPU and secondary storage are close enough.]
c) Sprint has installed a system that is capable of converting analog data to digital signals for transmission.
d) If a computer had special cables, long-distance computer communications could be easily converted from analog to digital.

***ACCORDING TO THE EXPLANATION GIVEN IN THE TEXT, CHOOSE THE RIGHT TERM TO FILL IN FIG. 10-1*:**



47) a) ACOUSTIC COUPLER [✓ c) SERIAL PORT]
b) PARALLEL DATA TRANSMISSION d) INTERNAL MODEM

48) [✓ a) ACOUSTIC-COUPLER MODEM] c) INTERNAL MODEM
b) STAND-ALONE MODEM d) SERIAL PORT

49) a) RS-232C CONNECTOR c) ASYNCHRONOUS COMM. PORT
[✓ b) DIRECT-CONNECT MODEM] d) CPU

50) Choose **the title** that best expresses **the main idea of the whole text**:

a) KINDS OF MODEMS FOR COMPUTER COMMUNICATIONS.
b) COMPUTER COMMUNICATIONS OF THE FUTURE.
[✓ c) SENDING A MESSAGE: COMMUNICATION INTERFACES.]
d) ANALOG AND DIGITAL SIGNALS.

V. Read the text carefully and choose the right option. Only one is correct.

ROBOTS:COMPUTER AUTOMATION IN THE FACTORY

Want a robot built to order? A Colorado company will make you one in the shape of a milk carton that can talk and move. Or, if you prefer, you may have a furry robot that (51)_________________ ride a tricycle.

Are these the kinds of robots that are going to be important in the future? (52) ***Actually***, these are purely for entertainment and are only one variety. Robotics --the study of the design, construction, and use of robots-- is a serious engineering field.

(53) ***Unlike*** standard assembly-line machines, (54) ***which are designed*** to perform one function, robots have two qualities that make them flexible. They are (55)_________________, which means they are able to do more than one task, and they are reprogrammable, which means they can be reprogrammed to (56) ***carry out*** many kinds of tasks. These two characteristics mean that, unlike traditional kinds of machinery, robots are not apt to become obsolete.

Robotics (57) ***can be divided into*** four areas. These include large industrial robots, small industrial robots, mobile robots and artificial intelligence or expert systems.

Large industrial robots are (58) ***computer-controlled tools*** used on factory assembly lines to perform skills previously performed by human beings, such as welding or paint spraying. Although automatic machinery in the form of stand-alone machine tools has been in use for years on production lines, industrial robots —also (59) ***known as*** flexible manufacturing systems (FMSs)— are far more versatile. Most robots operate by electronic impulses through a claw, but others use hydraulic pressure for heavy work.

Small industrial robots are highly reprogrammable systems which generally handle objects up to 20 pounds. These include machine vision systems --robots that 'see' with (60)_________________ that can be used for parts inspection, production identification, and robot guidance. Other robot systems operate by touch, measuring sizes and shapes, temperature, (61)_________________ and so on.

Mobile robots are the kind people think of when they hear the word robot -(62) ***namely***, (63)_________________ that can roll around and talk. Some can also serve drinks at cocktail parties and do vacuuming (up to a point), and there is a great deal of discussion about building robots for household tasks. Some have called these machines 'showbots'; they are not true robots (64)_______________ they are not able to do more than one task and are not reprogrammable. These robots have some use in office as mailmobiles.

Artificial intelligence or expert systems is the most promising area of all. Artificial intelligence (AI) is the field of study concerned with exploring tasks for computers to do that previously were reserved for human intelligence, imagination, and intuition. A National Research Council report has predicted that AI will affect the circumstances of human life profoundly. AI will surely create a new economics, a new sociology and a new history.(65) ***If artificial intelligences can be created at all, there is little reason to believe that they could not (66) LEAD TO the construction of superintelligences able to explore significant mathematical, scientific or engineering alternatives at a rate far exceeding human ability***. Artificial intelligence already has created expert systems, computer programms that essentially copy the knowledge-- both textbook knowledge and tricks of the trade-- of humans experts in a particular field.

From: **COMPUTERS AND INFORMATION SYSTEMS by O'Leary / Williams, Benjamin / Cummings Publishing Co., Arizona State University. 1989, p.206-208.**

51) [✓ a) can] b) must c) should d) ought to

52) "*Actually*" means:
a) now b) after a short time [✓ c) really] d) at present

53) ***Unlike*** is a synonym of:
a) dislike [✓ b) not like] c) likely d) liked

54) "***which are designed***" can be substituted by:
[✓ a) designed] b) that are designed c) designing d) are designed

55) a) maxifunctional b) overfunctional c) macrofunctional [✓ d) multifunctional]

56) "***carry out***" can be substituted by:
a) realize b) make up [✓ c) perform] d) continue

57) "***can be divided into***" can be substituted by:
a) can be classified as [✓ b) can be made up of] c) can belong d) can consist in

58) "***computer-controlled tools***" can be defined as three of the following. Choose the **WRONG ONE.**
a) tools controlled by computers
b) tools which are controlled by computers
c) tools that are computer-controlled
[✓ d) tools used for controlling computers]

59) "***known as***" can be substituted by:
[✓ a) called] b) called as c) defined as d) named as

60) a) hardly b) hardship [✓ c) hardness] d) hard

61) ***A system of vision which includes a camera of television*** is a:
a) television-vision camera system
[✓ b) television-camera vision system]
c) vision-system camera television
d) television camera-vision system

62) "***namely***" can be substituted by:
[✓ a) that is] b) for example c) such as d) like

63) ***Machines that are like people*** are:
a) people machines [✓ b) peoplelike machines] c) likepeople machines d) machines as people

64) a) because of b) due to [✓ c) since] d) owing to

65) This sentence means:
a) If we create superintelligences, we won't be able to explore certain mathematical, scientific and engineering alternatives.
b) Unless we explore certain mathematical, scientific and engineering alternatives, we won't be able to create superintelligences.
c) If we don't explore certain mathematical, scientific and engineering alternatives, we won't be able to create superintelligences.
[✓ d) If superintelligences are created, they could be able to explore certain fields better than human beings.]

66) "***lead to***" CANNOT be substituted by:
a) give rise to [✓ b) result from] c) result in d) cause

VI. Read the text carefully and choose the right option. Only one is correct.

Environmental concerns, impinging on all aspects of electronics and electrical engineering, have been transformed from an afterthought or a reaction to government legislation to an integral part of the design process.

Many companies are developing databases that help design engineers make environmentally benign choices of one process over another. Significant numbers of new products are being designed to use recycled plastics and environmentally friendly materials. "Sleep" modes, *(67)*_______________ the energy consumption of products when they are not in use, are common. And environmental issues are being integrated into *(68)*_______________ and R&D efforts.

(...)

We in the environmental world are living through exciting times --an era that has seen more rapid change than any epoch in history. Technology is quickly erasing borders; decisions are more global in nature; and corporations today have become agents of environmental change, shaping the future. Each of us is involved in a great cultural transformation that is being driven in large measure by environmental concerns. The participants are industry, its investors (shareholders), government, and the general public --including our young children.

This culture change, and its effects upon us, began in the 1970s with the first wave of environmental regulations, targeted at specific sources of pollutants. During the '80s, there was a shift toward waste reduction or pollution prevention. Now, in the '90s, concern focuses not on the end of pipes or the tops of smokestacks but on such sweeping regional and global issues ***(69) as*** acid rain and climate change. Industrial ecology (IE)—the study of the relationships among firms in industrial production networks and the effects of these relationships on both the flow of energy and materials through the economy and the natural world *(70)*_________________— is emerging as the framework for integrating environmental factors into business and *(71)*_______________ decision-making.

Corporations have started to view the environment as a major strategic issue, taking into consideration competitive advantages, business opportunities, and environmental liabilities. Now we are emerging from a command and control regulatory process to a more voluntary, cooperative effort between the relatively diverse segments of government, corporations and environmentalists.

(72) As we have become more knowledgeable, we have learned that "end-of-pipe" controls on environmental releases do not achieve sustainability, and we are therefore beginning to think about eliminating pollution at the source. This approach, known as Design for the Environment (DFE), involves the broader concept of sustaining environmental concerns and pollution prevention from the design stage to the end of a product's life cycle.

We are headed in the right direction, but clearly there is more to do on a national basis: we must acquire a sophistication that will help us optimize the flow of materials and integrate the life cycles of diverse products, so that the waste streams from one activity become the raw materials for another.

It is incumbent upon individuals and corporations to take an active part in setting national and international environmental policies and legislation. Nations and corporations with diverse interests must work together to realize the full cycle of the DFE concept.

From: **IEEE SPECTRUM JANUARY 1995 p.60-61**

67) Which one is **WRONG?**

a) which reduce [✓ b) reduced] c) reducing d) that reduce

68) ***Strategies in businesses whose effects will be seen in the distant future*** are:

[✓ a) long-term business strategies]
b) long term businesses strategies
c) long-term business~~es~~ strategies
d) long term business strategies

69) "*as*" can be substituted by:

[✓ a) like] b) i.e. c) for example d) for instance

70) One of the following **CANNOT BE USED** here. **WHICH ONE?**

a) in which the economy is embedded
b) where the economy is embedded
c) that the economy is embedded in
[✓ d) in that the economy is embedded]

71) Choose the right ***adjective:***

a) economical BARATO [✓ b) economic] ECONOMIA c) economy d) economics

72) "*As*" can be substituted by:

a) Because of [✓ b) Since] c) The reason why d) So

73) According to the ***fourth paragraph***. Which one is ***FALSE***?

a) Environmental concerns have moved from specific to general issues.
b) In the 70s, they concentrated on the source of different kinds of pollutants.
c) In the 80s, the main concern was on how to reduce waste and prevent pollution.
[✓ d) In the 90s, the main concerns are the tops of smokestacks and global issues such as acid rain and climate change.]

74) According to the ***fourth paragraph***. **Industrial ecology** is the study of:

a) the relationships among firms.
[✓ b) the relationship among firms and how they affect the environment.]
c) how industrial production affects the relationship among firms.
d) the relationship between materials and the flow of energy.

75) According to the ***fifth paragraph***. Which one is **FALSE?**

a) Corporations have started to view the environment more positively.
b) The environment is begining to be viewed as a major strategic issue by corporations.
[✓ c) There is an emergence of a control regulatory process.]
d) There is a tendency towards a cooperative effort between government, corporations and environmentalists.

76) According to the ***sixth paragraph***. **DFE** is an approach that involves:

[✓ a) the elimination of pollution at the source.]
b) 'end-of-pipe' controls.
c) the prevention of pollution at the end of a product's life.
d) the prevention of the design stage.

77) According to the ***seventh paragraph***. Which one is **FALSE?**

a) We must optimize the flow of materials.
b) Waste from one activity must be transformed into raw materials for another.
[✓ c) All raw materials should give rise to waste.]
d) Some waste must result in raw materials.

78) According to the text, which of these **titles best expresses the main idea?**

a) The environment
[✓ b) Industry and its effects on the environment]
c) The change of industry from the 70s to the 90s
d) Industry and the problem of pollution

TEST 7

I. Identify the mistake in these sentences.

1) Metal-oxide-semiconductor (MOS) technology was originally developed ***(a) for*** digital large-scale integration (LSI) design. ***(b) Owing to*** their small size and the ***(c) self-isolating nature*** of enhancement mode, MOS transistors allow a higher density ***(d) is achieved*** on an IC chip than is possible with bipolar technology.

2) The monolithic operational amplifier, or op amp, is ***(a) the most widely known*** and used class of analog integrated circuits. ***(b) Until*** its introduction in the mid 1960s, the monolithic op amp has proliferated into many different designs and has found ***(c) its*** way into ***(d) countless*** applications.

3) If I ***(a) had known*** that English was going to be so important for ***(b) my professional career***, I ***(c) would have studied*** a lot more during ***(d) my University degree.*** YEAR

4) The European system ***(a) for classify*** ING semiconductor diodes involves an alphanumeric code ***(b) which employs*** ***(c) either*** two letters and three numbers (general-purpose diodes) or three letters ***(d) and*** two numbers (special-purpose diodes).

5) The study of ***(a) Electronics*** will be the ***(b) basis*** for a good ***(c) university training*** ***(d) as long*** engineers are needed in companies.

[illegible] ING

6) A digital ***(a) programmable*** system ***(b) allows*** flexibility ***(c) when reconfigure*** signal processing operations ***(d) by simply changing*** the program.

[illegible]

7) The low cost of that system can be ***(a) due to*** the hardware is cheaper, or maybe it is ***(b) because of*** its flexibility for modifications. (c) ***Depending on*** the kind of feedback, a system can be closed or open. Closed systems are those ***(d) in which*** the feedback is only from within the system whereas in open systems it is from outside the system.

II. Choose the right option. Only one is correct.

8) In 1886, Hertz verified experimentally that electrical energy ________________ be radiated and thus proved the existence of electromagnetic waves.

a) must [✓ b) could] c) should d) shall

9) That is the lab ________________ scientists work on the new project ______________.

a) where/~~in~~ [✓ b) in which/---] c) which/~~--~~ IN d) in that

10) The head of the match is rubbed rapidly against the striking surface. The friction ________________ causes heat to be produced.

a) generating = b) which generates [✓ c) generated] d) which is generating

11) The temperature ____________________ will be reached if you follow my instructions. Which one is ***WRONG***?

[✓ a) at that the chemical solution must be]
b) the chemical solution must be at
c) which the chemical solution must be at
d) at which the chemical solution must be

12) Artificial worlds in virtual reality are built up in a computer memory ______________ make people walk through, look around, and even touch objects. Which one is ***WRONG***?

a) in order to b) so as to c) to [✓ d) so that]

13) Opening the switch ________________ through the coil, and closing the switch allows current to flow through it.

a) avoids current ~~from~~ flowing AVOID TO
b) prevents current ~~to~~ flow
[✓ c) prevents current from flowing] PREVENT FROM
d) prevents current

14) A double-pole switch ________________ two sets of contacts which can be used to connect and disconnect two circuits (or parts of a circuit) simultaneously.

[✓ a) consists of] b) forms = c) makes up d) is part of

15) A tone generator is an electronic circuit which ________________ generating coded audio signals which are used in modern digital telephone systems for dialling a number. Which one is ***WRONG***?

a) is responsible for [✓ b) serves to] V-ING c) perfoms the function of d) is used for

16) Converters used in power electronics can be ________________ the type of device used, the function of the converter, how the devices in the converter are switched and so on.

a) classified as
b) placed in the class
[✓ c) classified according to]
d) classified into

17) PVC and polythene are examples of thermoplastics,*i.e.*, plastics which soften when heated and become rigid when cooled again. *i.e.* means:

[✓ a) that is] b) for instance c) like d) exempli gratia e.g

18) Pollution ______________ changes in the atmosphere. Which one is ***WRONG***?
a) produces   b) results in   [✓ c) results from]   d) brings about

19) ______________ computers can make you waste a lot of money, careful consideration goes into buying them.
[✓ a) Because]   b) Because of   c) Due to   d) As a result of
AS, SINCE

20) In the Data Processing Department there is no strict demarkation of jobs. __________, when a project is completed the team is disbanded. Which one is ***WRONG***?
a) As a result   b) Therefore   c) Thus   [✓ d) Since]

21) If such percentage ______________, a lot of money would be made in a very short time.
a) would be reached   b) will reach   [✓ c) were reached]   d) had be reached

22) If we ______________ life on Venus, some of us ______________ there now.
[✓ a) had found / might be living]   b) would have found / would be living
c) found / would have lived   d) could have found / had lived

23) I couldn't get a grant ______________ I had five year's teaching experience.
a) otherwise   b) so long as   c) in case   [✓ d) unless]

24) If *Burger King Corp.* had developed its own expert system in due time, it __________ its hamburger competitor *McDonald's* three years ago.
a) will have outperformed   [✓ b) would have outperformed]
c) had outperformed   d) could had outperformed

25) The DataGlove and other similar interface devices will have many applications ____________ they are replaced with more useful devices in the future.
a) unless   [✓ b) provided]   c) otherwise   d) in the event

26) Additives that contain ING sulfur are:
a) sulfur-contained additives   b) sulfur-contain additives
c) containing-sulfur additives   [✓ d) sulfur-containing additives]

27) The main parts are the frame, a ______________ tube fastened to the frame and a thimble.
[✓ a) three-inch]   b) three inches   c) three-inches   d) three-inched

28) That discovery was an important ______________ in the history of computers.
a) breakout   b) breakdown   [✓ c) breakthrough]   d) break-in

29) ______________ is the process of converting a digitally coded signal back to its original form.
a) uncoding   b) discoding   c) non-coding   [✓ d) decoding]

30) The ______________ fax machines, which must be linked to a special digital phone line, can send a document to several places at once for the price of one phone call.
a) last   [✓ b) latest]   c) actually   d) unique
REALMENTE

III. Read the text carefully and answer the questions.

The oldest and still most common transmission line, wire cable is a major part of the nation's telephone system. Originally, telephone lines were simply pairs of copper wires strung between poles. Later these wire pairs were improved upon by the development of cables in which several hundred pairs of wires were bundled together to form a single cable. A more recent improvement is coaxial cable, in which multiple wires are replaced by a single solid core. You are apt to see coaxial cable used to link parts of a computer system located on one site. (31) (32)

A more recent development, microwave transmission consists of high-frequency waves that travel in straight lines through the air rather than through wires. Because the waves cannot bend with the curvature of the earth, they are relayed via antennas placed on the tops of buildings--including those of banks--and mountains and located usually every 25 to 35 miles. More than half of the telephone system is now made up of microwave technology.

Communication satellites in space, orbiting 22,000 miles above the earth, are also used as microwave relay stations because they rotate at the precise point and speed above the equator that makes them appear stationary to microwave transmitters on the ground. Among dozens of satellites now orbiting the globe and handling voce, video, and data communications are those launched by INTELSAT, short for *I*nternational *Tel*ecommunications *Sat*ellite Consortium. INTELSAT began with the Early Bird satellite in 1965 and now forms a worldwide communications system of over 100 countries. It accounts for most long-distance international communications. The United States's representative to the consortium is COMSAT (*Com*munications *Sat*ellite Corporation).

Other satellite systems include those owned by RCA, the Americom system, which was the first to offer domestic communications service via satellite; Western Union, which launched its Westar system in 1974; AT&T, which leases satellites from COMSAT; Satellite Business Systems, put together by IBM, Aetna Life and Casualty Insurance Company, and COMSAT and which began operating in 1981; and American Satellite Company, developed by Fairchild Industries and Continental Telephone Company, which leases satellite usage from Western Union. Because of increasing telephone costs and decreasing satellite costs, satellite transmission is becoming a more popular form of data communications. (33)

One of the most exciting new communication technologies is fiber optics, in which data is transmitted as pulses of light through tubes of glass half the diameter of a human hair. Among the many advantages of fiber optics are that the materials are lighter and less expensive than wire cables, more flexible than microwave and not limited to line-of-sight transmission, and faster and more reliable at transmitting data than the other communications materials. However, with fiber optics the distance with which information may be transmitted is limited. (34)

(FROM: COMPUTERS AND INFORMATION SYSTEMS by O'Leary/ Williams. Benjamin Cummings Publishing, 1989. pp 325-8)

31) What are the main data transmission media explained in the text?
- a) coaxial cables, communication satellites and fiber optics.
- [✓ b) wire cable, microwave and fiber optics.]
- c) microwaves and fiber optics.
- d) wire cable, coaxial cable and fiber optics cable.

32) According to paragraph 1, which is ***FALSE?***
- a) Copper wire cable was, and still is, used for the telephone system.
- b) Cables have developed so much that now it is possible to have many pairs of wires forming just one cable.
- c) Coaxial cable is made up of a solid core.
- [✓ d) Wire cables have gone through many improvements and more data can now be sent with just a pair of wires.]

33) According to paragraphs 2, 3 and 4, which is ***TRUE***?

a) Microwave transmission depends heavily on the curvature of the earth for the proper transmission of data.

× b) Microwave transmission is possible provided there are relay antennas every 25 to 35 miles that avoid the effects of the curvature of the earth.

c) Microwave transmission uses satellites as transmitters.

d) Satellite transmission is not economical for data communications.

34) According to the last paragraph, which is ***FALSE?***

× a) One of the disadvantages of fiber optics is that the transmission has to be done within line-of-sight.

b) The development of fiber optics has been a major breakthrough due to the number of advantages it offers.

c) Fiber-optic cables consist of hairlike glass fibers which carry voice, television and data signals.

d) Fiber optics allows a lot of information to be transmitted as long as the distance to travel is short enough.

NOW THAT YOU HAVE READ THE TEXT CAREFULLY,

35) Which of these statements on microwave transmission is ***not valid*** for figure 1?

a) With microwave transmission, microwave repeater stations must be located every few miles.

b) Line-of-sight transmission is limited to microwave communications.

c) With microwave transmission, the signal travels by line of sight and hence cannot bend around the curvature of the earth.

× d) Microwave transmission travels in straight lines through the air that follow the curvature of the earth.

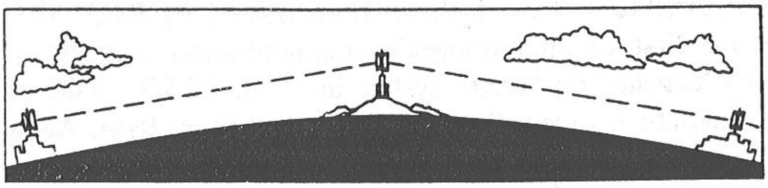


Fig. 1

36) Which of these statements ***is not valid*** for Figure 2?

a) Satellites collect data from several sources and relay the messages received to different microwave earth stations.

b) Satellite, or microwave, earth stations enable the sending and reception of messages from satellites.

× c) Fiber optic cables are a good means of delivering long-distance messages to satellites and back.

d) Satellite communication is mainly used for most long-distance international communications.

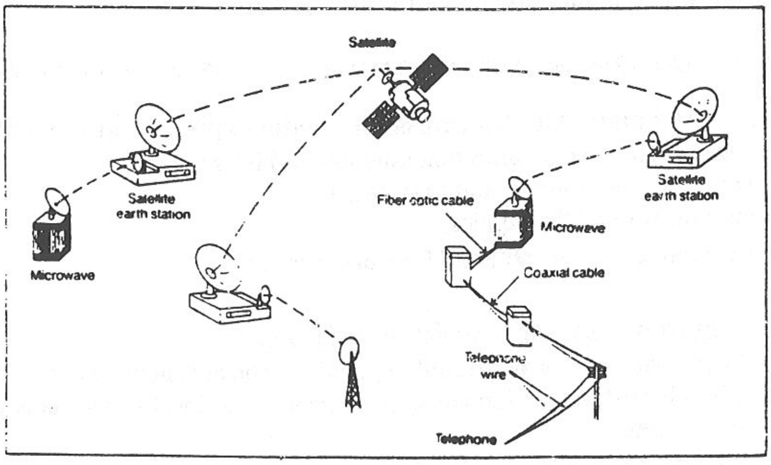


Fig. 2

IV. Read the text carefully and answer these questions.

BASIC ELEMENTS OF A DIGITAL SIGNAL PROCESSING SYSTEM.

Most of the signals encountered in science and engineering are analog in nature. That is, the signals are functions of a continuous variable, such as time or space and usually take on values in a continuous range. Such signals may be processed directly by appropriate analog systems such as filters or frequency analyzers or frequency multipliers for the purpose of changing their characteristics or extracting some desired information. In such a case we say that the signal has been processed directly in its analog form, as illustrated in Fig. 1.2. Both the input signal and the output signal are in analog form. ***(37)***

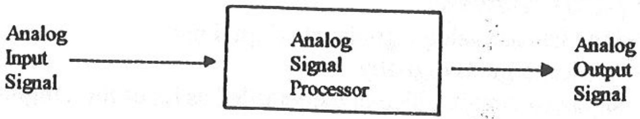


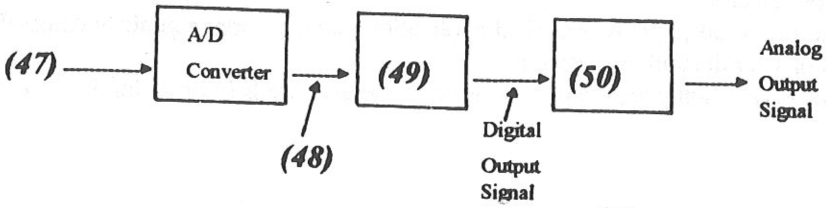
FIGURE 1.2 Analog signal processing

Digital signal processing provides an alternative method for processing the analog signal, as illustrated in Fig. 1.3. To perform the processing digitally, there is a need for an interface between the analog signal and the digital processor. This interface is called an *analog-to-digital (A/D) converter*. The output of the A/D converter is a digital signal that is appropriate as an input to the digital processor. ***(38)***

The digital signal processor may be a large programmable digital computer or a small microprocessor that is programmed to perform the desired operations on the input signal. It may also be a hardwired digital processor that is configured to perform a specified set of operations on the input signal. Programmable machines provide the flexibility to change the signal processing operations through a change in the software, whereas hardwired machines are difficult to reconfigure. ***(39) Consequently***, programmable signal processors are very common in practice. On the other hand, when the signal processing operations are well defined, as in some applications, a hardwired implementation of the operations can be optimized so that it ***(40) results in*** a cheaper signal processor and, usually, one that runs at a faster speed than its programmable counterpart. ***(41)***

In applications where the digital output from the digital signal processor is to be given to the user in analog form, as in speech communications, for example, we must provide another interface from the digital domain to the analog domain. Such an interface ***(42)***____________ *a digital-to-analog (D/A) converter*. Thus the signal is ***(43) provided*** to the user in analog form, as illustrated in the block diagram of Fig. 1.3. There are other practical applications, however, ***(44)***__________ signal analysis applications where the desired information is conveyed in digital form and no D/A converter is required. For example, in the digital processing of radar signals, the information extracted from the radar signal, ***(45) such as*** the position of the aircraft and its speed, may simply be printed on paper. There is no need for a D/A converter in this case. ***(46)***

FIGURE 1.3 Block diagram of a digital signal processing system.



(From: DIGITAL SIGNAL PROCESSING. Principles, Algorithms and Applications by John C. Proakis & Dimitris G. Manolakis.
MacMillan Publishing Co., New York 1992, pp. 4-5)

37) Which of these is ***FALSE*** according to the **1st paragraph?**

a) Filters, frequency analyzers and frequency multipliers are used for either changing the characteristics of a signal or extracting information from it.

b) Filters, frequency analyzers and frequency multipliers can process analog signals since they are analog systems.

[✓ c) For an analog signal to be processed directly by an analog system, three devices are needed: a filter, a frequency analyzer and a frequency multiplier.]

d) The great majority of the signals found in engineering are basically analog.

38) Which of these is ***FALSE*** according to the ***2nd paragraph***?
An analog-to-digital (A/D) converter...

a) is an interface used to change analog signals into digital ones.

b) is a device used to process signals digitally.

c) produces a digital signal as output which is then needed as input for a digital processor.

[✓ d) is a useful method for processing analog signals.]

39) ***"Consequently"*** is not a synonym of one of these. Which one?

a) Therefore [✓ b) However] c) Hence d) Thus

40) ***"results in"*** cannot be substituted by one of these. Which one?

a) brings about b) gives rise to [✓ c) results from] d) leads to

41) Which of these is ***FALSE*** according to the ***3rd paragraph***?

a) The digital signal processor can be made up of a programmable machine (or a small microprocessor) or a hardwired machine.

b) One of the advantages of programmable machines over their hardwired counterpart is that they allow you to reconfigure the software easily.

c) Programmable signal processors are much more common even though they may need a more expensive signal processor and may run at a slower speed than hardwired machines.

[✓ d) A hardwired digital processor should be used because of its speed, even when the operations are not well defined.]

42) a) are known as [✓ b) is referred to as] c) can be defined d) is called as

43) ***"provided"*** in this context means the same as:

a) as long as b) on the condition that [✓ c) supplied] d) analysed

44) [✓ a) involving] b) who involv~~e~~ ing c) that involv~~ing~~ e d) involved

45) ***"such as"*** can be substituted by:

a) an example of b) that is c) namely [✓ d) like]

46) Which of these is ***TRUE*** according to the ***4th paragraph***?
A digital-to-analog (D/A) converter...

a) must be used in speech communications and in the digital processing of radar signals.

[✓ b) is used as an interface in applications in which the user needs an analog signal coming from the digital domain.]

c) is an interface used in many practical applications such as radar signals to detect the position of aircrafts and their speed.

d) has to be used in many applications as long as the user needs information in the digital form.

ACCORDING TO ***paragraphs 2, 3 & 4***, CHOOSE THE RIGHT TERM TO COMPLETE ***the block diagram of a digital signal processing system*** in Figure 1.3:

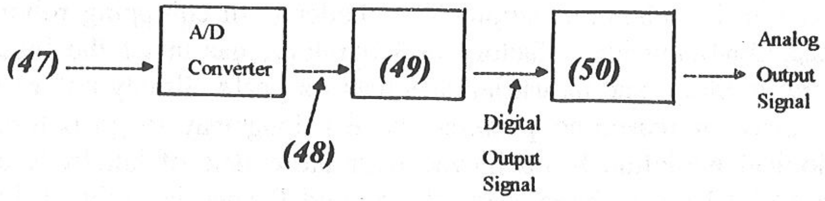
47) [✓ a) Analog Input Signal]
b) D/A Converter
c) Digital Input Signal
d) Digital Signal Processor

48) a) Analog Input Signal
b) D/A Converter
[✓ c) Digital Input Signal]
d) Digital Signal Processor

49) a) Analog Input Signal
b) D/A Converter
c) Digital Input Signal
[✓ d) Digital Signal Processor]

50) a) Analog Input Signal
[✓ b) D/A Converter]
c) Digital Input Signal
d) Digital Signal Processor

FIGURE 1.3 Block diagram of a digital signal processing system



V. Read the text carefully and choose the right option. Only one is correct.

THE ROBOTICS REVOLUTION

Many of the robots in use today do jobs that are especially difficult for human workers. These are the types of jobs that require great strength or pose danger. For example, robots are particularly useful in ***(51) the industry which manufactures autos,*** where parts of automobiles are welded together. ***(52) As*** mechanical supermen, robots ***(53) may*** be required to do anything from moving heavy components between workstations on a factory floor to carrying bags of cement.

Spray painting is another task suited to robots as they do not need to breathe. ***(54) Unlike*** human painters, they are unaffected by the poisonous fumes. Third in the list of useful jobs is the assembly of electronic parts. Robots shine at ***(55) installing*** chips in printed circuit boards ***(56) because of*** a capability that robots have that people don't; their automatic accuracy is particularly valuable in this kind of industry ***(57) since*** locating and fixing mistakes is costly.

In their efforts to expand the range of robotic applications, researchers are looking beyond traditional designs to examine a variety of potential models from the biological world. The industrial arm is a classic example. The challenge of equipping robots with the skills to operate independently, outside a factory or laboratory, has taxed the ingenuity and creativity of academic, military, and industrial scientists for years. Simply put, robot hands -- like robot legs or eyes, or reasoning powers-- have a long way to go before they can approach what biological evolution has achieved over the course of hundreds of millions of years. Much more will have to happen in labs around the world before robots can be compared to nature's handiwork.

In the meantime, the robotics revolution is already beginning to change the kind of work that people currently do. By the turn of the century, more and more humans will be required for tasks that machines cannot do.

51) ***'an industry which manufactures autos'*** is:
a) a manufacturing-auto industry
[✓ b) an auto-manufacturing industry]
c) an auto-manufactured industry
d) an industry-manufacturd auto

52) ***'As'*** can be substituted by:
[✓ a) like] b) i.e. c) for example d) for instance

53) ***'may'*** can be substituted by:
a) shall b) must [✓ c) can] d) should

54) ***'Unlike'*** is a synonym of:
a) dislike b) likely c) liked [✓ d) not like]

55) ***'installing'*** is a synonym of:
[✓ a) setting up] b) standing up c) carrying out d) picking up

56) ***'because of'*** is ***NOT*** a synonym of:
a) as a result of b) due to [✓ c) because] d) owing to
AS since

57) ***'since'*** can be substituted by:
a) because of [✓ b) as] BECAUSE c) the reason why d) so

58) Which one is ***TRUE*** according to **the first paragraph**?
a) Robots may be named mechanical supermen because they can do everything except carrying heavy components or cement bags.
b) Robots cannot transport anything between workstations on a factory floor.
[✓ c) Moving and carrying heavy things are some (among others) of the tasks robots can do.]
d) Robots cannot only move heavy loads but also work as mechanical supermen.

59) Which is ***FALSE*** according to **the second paragraph**?
a) Robots excel man when installing chips or any other electronic part.
b) Because an error when installing electronic devices can be very expensive, robots are preferred to men.
[✓ c) The most suitable type of jobs for robots is the installation of chips because these are shining, whereas man-made chips aren't.]
d) Robots are capable of doing a far more accurate job when locating and fixing electronic parts, which is an economic advantage for companies.

60) Which is ***TRUE*** according to **the third paragraph**?
a) Researcher's efforts to imitate biological parts or human capacities have clearly reached, even improved, the biological evolution state.
b) In spite of being ingenuous, military and academic scientists have applied their creativity to robotics, and obtained skilled robots capable of working on their own.
c) Depending on what happens in certain laboratories around the world, future robot models will or will not resemble biological models.
[✓ d) Many kinds of scientists have been working for a long time in order to make man-like robots.]

61) Which is ***TRUE*** according to **the last paragraph**?
a) Although the robotics revolution has just begun, the tendency is that there will be more and more robots instead of men, thus making the rate of unemployment increase.
[✓ b) We could infer from the text that in a near future people won't lose their jobs, they will just change the type of task they do.]
c) At the beginning of the 21st century humans will not be so necessary as they are now.
d) In some years' more and more humans will do repetitive and boring tasks.

VI. Read the text carefully and choose the right option. Only one is correct.

VIRTUAL REALITY IS FOR REAL

Although virtual reality has become a popular buzzword with 'frivolous' connotations, its ability to immerse users in interactive three-dimensinal worlds is of great relevance for many scientific and industrial endeavors. Perhaps one reason for the lack of public knowledge is that some companies are keeping their efforts under wraps --sometimes even requiring cooperating universities or firms to sign non-disclousure agreements-- to protect their competitive advantage. This secrecy indicates how important the emerging field has become.

In prosaic terms, Virtual Reality (VR) endeavors to create a very natural interface between humans and computers, where communication can take the form of moving 3-D imagery, spatial sounds, and even physical forces --from motion to crude touch--.(Smell is also being examined). The better systems can be so responsive and render imagery so fast that the user can feel immersed in the synthetic environment. This has all sorts of entertainment possibilities, like immersive video games and films, and many practical ones, too. For instance, the ability to do 'soft designs' of cars or space stations that engineers can literaly enter (rather than view from the window of a computer) might ***(62) result in*** better products at lower cost.

At the very least, a VR system consists of a display, a tracking device for interactivity, a computer image generator, a three-dimensional database, and an application software. The several types of displays available are suited to different tasks. The most basic and economical, ***(63)*_________________** several thousand dollars and not including the computer, is the computer monitor approach, with liquid-crystal shutter glasses and tracker. The monitor display changes according to the user's head movements as tracked by a device on top of the monitor. The small field of view of this system prevents a sense of immersion but, on the other hand, allows slower frame rates and so sharper imagery. Also, the risk of nausea is less compared to more immersive displays.

The greatest sense of immersion is provided by the ***(64) head-mounted display*** (HMD), which blocks out the real world and even allows the user to assume a new body form, such as that of a fish. There are also see-through HMDs that display a combination of the virtual and real worlds, ***(65) known as*** augmented reality. A head-coupled display (HCD) is like a huge pair of binoculars supported by a moveable robot-like arm. HCDs can often offer better resolution and a wider fiels of view because weight is less of a concern than with HMDs. They also offer immersion with the added benefit of quick entry and exit, which is why they are favourite at trade shows and museums. (...)

Mature enough to be interesting, VR still needs much work and assessment before it can become a common tool for indusry because shortcomings are severe and impose serious limitations on VR applications. Both the current problems and potential ones are evident in a recent proposal to the Pentagon's Advanced Research Projects Agency urging the formation of the Michigan Virtual Reality Center, in Ann Arbor. According to the July proposal, the members *'felt strongly'* that the successful introduction of VR in industry requires that many human factors be examined, from acceptable levels of image reduction and accuracy in synthetic, industrial environments to stress, fatigue, and other physiological problems. Finally, the proposal notes there is a *'pressing need from potential industrial users'* for standarised measures of performance that would help to select expensive equipment for a specific application. It is hoped that *'the results will bring clarity to the confusing VR market'*.

IEEE Spectrum, October 1993

62) A synonym of ***'result in'*** is:
[✓ a) lead to] b) result from c) be caused by d) solve

63) Which one is ***WRONG***?
a) who cost b) that they cost [✓ c) that cost] d) costing

64) A ***'head-mounted display'*** is:
[✓ a) a display monitor placed on the user's head.]
b) a user that is placing or mounting the display on his/her head.
c) a display that mounts heads. = MOUNTING
d) a head appearing on a display monitor.

65) ***'known as'*** is a synonym of:
a) defined as [✓ b) called] c) defined d) called as

66) Which one is ***TRUE*** according to ***the first paragraph***?
a) Public authorities don't know much about advances made in VR because universities and firms refuse to sign research agreements.
b) VR is very popular both due to the effort of some companies and the universities cooperation.
[✓ c) The reason why scientific and industrial research is kept secret is that VR can be applied to many fields, thus making firms more technologically competitive.]
d) Universities have collaborated with companies interested in VR provided companies keep experiments and results secret.

67) Which is ***TRUE*** according to the ***second paragraph***?
a) VR just tries to create a synthetic relationship of entertainment between computers and people.
b) Engineers use VR so that they can view the design of a car from the window of a computer.
c) In spite of the wide range of possibilities VR has, it won't be a truly useful tool.
[✓ d) If applied, VR could enable companies to make better and cheaper products.]

68) Which is ***TRUE*** according to the ***third paragraph***?
[✓ a) Depending on the movements of the user that the top device tracks, the monitor display will change accordingly.]
b) The monitor's display purpose is to change as well as track the user's head movements.
c) The device placed on top of the monitor is not a tracker.
d) The monitor display changes in order to track the user's head.

69) Which one is ***FALSE*** according to ***the fourth paragraph***?
a) A HMD enables the user to take a new shape and can display a combination of virtual and real worlds.
b) Both HMDs and HCDs provide the user with sense of immersion, though the second has better resolution.
[✓ c) The HMD's ability to enter and quit immersion quickly is the reason why it is preferred to a HCD at museums.]
d) HMDs offer the best sense of immersion whereas one can enjoy better resolution and a wider field of view with an HCD.

70) Which is ***TRUE*** according to ***the fifth paragraph***?
The formation of the Michigan Virtual Reality Center will:
a) impose serious limitations on VR applications
b) introduce VR in industry
[✓ c) examine many human factors affected by the introduction of VR in industry.]
d) press potential industrial users to standarize measures of performance.

KEY TO TESTS.

TEST 1

1) C
2) B
3) D
4) A
5) C
6) B
7) D
8) A
9) B
10) C
11) D
12) A
13) B
14) C
15) A
16) D
17) B
18) C
19) D
20) B
21) A
22) A
23) A
24) B
25) C
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27) A
28) D
29) C
30) D
31) B
32) D
33) C
34) B
35) A
36) C
37) A
38) D
39) B
40) B
41) C
42) A
43) D
44) D
45) A
46) B
47) C
48) D
49) B
50) A
51) C
52) B
53) D
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108) D
109) B
110) B
111) B

TEST 2

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61) C
62) D
63) C

TEST 3

1) C
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3) A
4) D
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6) D
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88) B
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90) C

TEST 4

1) A
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3) D
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8) C
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67) C
68) A
69) B
70) A

TEST 5

1) D
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79) C
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81) C
82) D
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84) B
85) C
86) A
87) D
88) B

TEST 6

1) D
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4) A
5) A
6) D
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8) A
9) B
10) A
11) C
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69) A
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75) C
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77) C
78) B

TEST 7

1) D
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3) D
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5) D
6) C
7) A
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9) B
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11) A
12) D
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48) c
49) d
50) b
51) B
52) A
53) C
54) D
55) A
56) C
57) B
58) C
59) C
60) D
61) B
62) A
63) C
64) A
65) B
66) C
67) D
68) A
69) C
70) C